► ANALYSIS

Wang painting the total network picture

But new layoffs show all is not well.

BY JOHN DIX
Senior Editor

LOWELL, Mass. — With the acquisition of telephone switch maker Intecom, Inc., Wang Laboratories, Inc. signaled its intention to vault into the next phase of office systems technology, where voice and data systems and applications are blended into integrated networks.
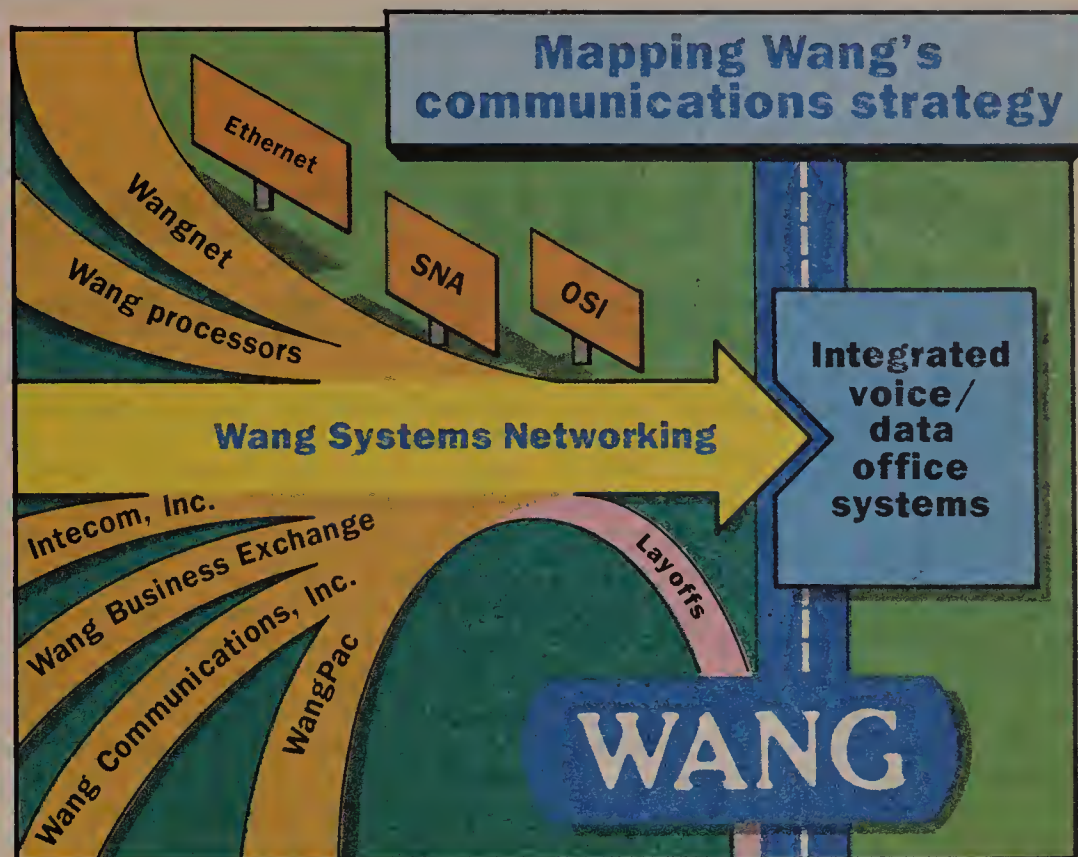
Wang is striving to employ in the communications world the ease-of-use features that won the company such success in the word processing market. That quest drives a growing range of communications products, services and ideas.

The company may have to move rapidly in implementing that strategy if it hopes to restore the luster to its once-stellar growth image. In the midst of lean times, Wang last week said it will lay off 1,600 employees, just 13 months after dismissing an equal number.

Besides Intecom, Wang's principal communications assets include

See **Wang** page 5

Mapping Wang's communications strategy

Ethernet • Wangnet • Wang processors • SNA • OSI

Wang Systems Networking

Intecom, Inc. • Wang Business Exchange • Wang Communications, Inc. • WangPac • Layoffs

Integrated voice/data office systems

WANG

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES   VOLUME 3, NUMBER 19   JULY 14, 1986

► STRATACOM, INC.

T-1 mux unveiled

New firm packetizes voice, data.

BY JOHN DIX
Senior Editor

NEW YORK — The first voice and data T-1 multiplexer based on packet-switching technology was unveiled here last week by StrataCom, Inc., a Cupertino, Calif., start-up founded by former top officials of Rolm Corp.

Despite its fledgling status, StrataCom already has two commercial users (see "Early users hail T-1 mux," page 5).

StrataCom's announcement comes on the heels of the first sign of consolidation in the young T-1 multiplexer market.

Just two weeks ago, Digital Communications Associates, Inc. acquired Cohesive Network Corp., another

See **StrataCom** page 6

► INDUSTRY FACE-OFF

Users girding for AT&T lease fight

BY BOB WALLACE
Senior Writer

Several thousand users may rebel against AT&T Information Systems and refuse to pay fees ranging from $10,000 to as much as $100,000 for prematurely terminating long-term lease equipment contracts, according to industry insiders.

AT&T claims it will sue users that avoid payment of the termination charges. AT&T also claims it will negotiate the charges with recalcitrant users if the customers decide to upgrade current AT&T equipment or purchase other AT&T gear.

Telecommunications consultants claim many of their clients find the situation intolerable and do not intend to pay termination charges if they disconnect AT&T customer premises equipment. Long-term equipment leases originally signed with lo-

See **Termination** page 8

NETWORK LINE

News

In a PC Expo-related debut, Lotus Development Corp. brings out new software that gives personal computer users access to a wide range of mainframe data. Page 2.

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One aggressive data communications manager cuts costs by $30,000 a month in the midst of a complete network overhaul. Page 2.

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Despite almost certain reductions in the investment tax credit, the leasing boom in the telecommunications equipment market is likely to continue. Page 2.

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In the wake of a recent Supreme Court ruling, public utility commissions in at least 10 states are hot on the trail of BOC refunds. As a result, users may get back millions of dollars. Page 3.

▼

Nasa is planning a 1990 launch for an experimental communications satellite dubbed the "switchboard in the sky." Its optical laser transmission systems could rival fiber optics in cost and performance. Page 3.

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Features

Since the divestiture of AT&T, opportunities for women have improved in the communications industry. But women must continue to carefully distinguish between subtle discrimination and the everyday obstacles of the race to get ahead in corporate America. Page 35.

NEWSPAPER

FEATURE FOCUS

"Hello, this is a voice mail recording."

BY JOHN DIX
Senior Editor

The pleasant voice you hear on your telephone may not belong to a smiling receptionist at the other end. Instead, you may be chatting with a computer that is programmed to lead you through a series of communications channels to your intended listener. This is voice mail. It may be impersonal, but it's a cost-effective business tool.

Once analogous to a large, shared tele-

Continued on **page 30**

▶ LOTUS DEVELOPMENT CORP.

Software lets PC users access mainframe data

BY NADINE WANDZILAK
Staff Writer

NEW YORK — In conjunction with PC Expo here last week, Lotus Development Corp. introduced microcomputer and mainframe software that gives personal computer users access to a wide range of mainframe data.

The Cambridge, Mass.-based company introduced The Application Connection (TAC), which provides connections between mainframe fourth-generation languages and statistical packages, and micro spreadsheet and data base management packages.

The introduction is the first fruit of Lotus' February acquisition of the New Paltz, N.Y.-based Information Center Software, Inc.'s microto-mainframe link technology. TAC grew out of an Information Center Software product called I-Link.

While not a true micro-to-mainframe link, TAC generates fourth-generation code that allows personal computer users to extract and update information in the mainframe data base, according to TAC product manager Mussie Shore.

The new Lotus software relies on other vendors' micro-to-mainframe link products to handle data transfers. It is compatible with standard communications links such as Micro Tempus, Inc.'s Tempus Link, Digital Communications Associates, Inc.'s Irma Link, VM Personal Computing, Inc.'s Relay, Lotus' Symphony Link, Hayes Microcomputer Products, Inc.'s Smartcom and Microstuf, Inc.'s Crosstalk as well as leading communications emulation boards.

TAC extracts information from the needed application and reformats it into a standardized form dubbed a transfer data base. The transfer data base contains the data itself and information about the data. From this data base, TAC translates the information into the appropriate personal computer or mainframe format.

TAC works with IBM mainframes running under the VM/CMS or MVS/TSO operating systems. It provides access to mainframe software products such as Martin Marietta Data Systems' Ramis II, Information Builders, Inc.'s Focus, SAS Institute, Inc.'s SAS, IBM's SQL/DS, D&B Computing Services' Nomad2, IBM's ADRSII and APLDI, as well as standard Qsam and CMS file formats.

TAC runs on IBM Personal Computer XTs and ATs, as well as Lotus-certified compatible personal computers with at least 192K bytes of memory.

The TAC software package includes a mainframe module priced depending on the operating system. The VM/TAC module is priced at $10,000, the MVS/TAC at $13,000. The personal computer-resident module, PC/TAC, is priced at $180 per personal computer. Optional mainframe modules supporting fourth-generation languages are priced from $8,000 to $10,000. ⏎

▶ TREND ANALYSIS

Leasing will rise despite tax credit demise

BY MICHAEL FAHEY
Staff Writer

The growing trend toward leasing in the telecommunications equipment market is likely to continue, despite the almost certain elimination of the investment tax credit resulting from congressional tax reform efforts.

Preliminary figures from an unreleased study by the American Association of Equipment Lessors (AAEL) indicate that the value of leases for telecommunications equipment, including switches and voice and data private branch exchanges, increased from $8.8 billion in 1984 to $14.1 billion in 1985.

In the future, however, the expected elimination by Congress of the investment tax credit will make it more difficult for some lessors to obtain financing and will lead to higher leasing costs.

The tax credit allows companies to deduct from their taxes 10% of their total investment in new capital equipment, according to Charles Greco, vice-president of financial services for International Data Corp., a Framingham, Mass.-based market research firm.

"For example," Greco said, "If I am a user or a leasing company and I buy a $500,000 phone system, Uncle Sam will give me a 10% investment tax credit. That comes to $50,000 in this case, and I can take it right off the bottom line of my tax bill from the IRS."

Repeal of the investment tax credit would effectively add 10% to

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▶ NET MANAGEMENT

$30,000 saved by user

BY MICHAEL FAHEY
Staff Writer

BALTIMORE — Norm Tolson has taken an aggressive approach to network management. The 47-year-old data communications manager for Consumer Credit Corp., headquartered here, has applied saving measures that have reduced his network costs by more than $30,000 each month.

In addition, Tolson is engineering a complete overhaul of Consumer Credit's network. The banking and finance company is replacing 760 Nixdorf Computer Corp. terminals in 420 branch offices with ISC Systems Corp. microprocessor-based intelligent terminals, which will be connected to a Control Data Corp. mainframe located at a CDC processing center in St. Louis, Mo.

"The new terminals will give us intelligence and computing power out in the field," Tolson explained. "The new technology will give us a competitive business advantage."

Considering Tolson's management style, it is surprising to hear him describe plans to link the remote sites with leased lines as an exercise in planned obsolescence.

"We are going with private lines because we want to ensure the integrity of our network, which is a vital part of our business," he said. "Private lines are the relevant technology for now." But Tolson added that private line networks will become obsolete in the near future as a result of new service offerings, such as software-defined networks (SDN) and Integrated Services Digital Networks, and sharp reductions in the cost of dial-up telephone service.

"Private lines are going to become much more costly in the future," Tolson said.

"And we won't be able to control the tariffs as we do now. New offerings, AT&T's Megacom and SDN, and even MCI Communications Corp.'s Prism are moving us toward switched facilities."

In the meantime, Tolson will continue to rely on private lines and take advantage of the savings that can be gleaned from manipulating telephone tariffs. "My job is to link up our branch offices in the most effective manner," Tolson said. "I have to install the most cost-effective network without negatively affecting service."

To achieve this goal, Tolson has employed local-exchange carrier bridging.

According to Tolson, there are other cost-saving options available to communications managers. "You have to look at a money-saving option and then weigh its possible effect on your network."

Tolson employs three network modeling systems from The Aries Group, Inc., Contel Business Networks and McGraw-Hill, Inc. to design and optimize his network. "We are not going to put all of our eggs in one basket," Tolson explained.

"The Aries product is probably the most versatile of all the tools. It provides a complete look at our entire network," Tolson said. "I use Contel's Mind system for engineering and optimizing our private lines, and the McGraw-Hill package is good for analyzing dial-up lines and looking at individual segments of the network."

For Tolson, using a variety of computerized optimizing tools fits with his operating philosophy, which he sums up this way: "Take advantage of the cost savings that are buried in the tariffs, and be ready to change to the new technologies when the time comes." ⏎

▶ REGULATION

BOCs liable for millions

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — The recent U.S. Supreme Court decision reaffirming states' authority to set intrastate telephone company depreciation rates has opened a floodgate of state regulatory activity.

In the wake of the high court's ruling, a number of state public utility commissions (PUC) have said they will order Bell operating companies to refund business and residential customers millions of dollars. That ruling limited the Federal Communications Commission's authority to mandate to PUCs the depreciation schedules for equipment used in providing intrastate telephone service ("Supreme Court curbs FCC rule over PUCs," *Network World*, June 2).

Any additional revenue the BOCs may have earned from higher rates based in part on the FCC-mandated depreciation schedules will be calculated and possibly refunded to customers in states that advocated slower depreciation schedules.

At least 10 states have already initiated refund proceedings, including Michigan, Washington ("Depreciation ruling may spur rebate," *Network World*, July 7), Louisiana, Ohio ("Cincinnati Bell to refund $20m," *Network World*, June 16), Arkansas, Vermont, Maryland, Iowa, Kansas and Kentucky.

Cincinnati Bell Telephone recently was ordered to refund to ratepayers more than $20 million.

The company said it had placed some $10 million in an escrow account in preparation for such a refund, which it contends will not affect future earnings.

The Maryland Office of the People's Counsel, which represents consumers before the state PUC, is asking for a minimum refund of $50 million from the Chesapeake and Potomac Telephone Co. of Maryland. Maryland's PUC is considering a faster depreciation rate than the one currently in use.

The Arkansas Public Service Commission has opened refund proceedings concerning Southwestern Bell Telephone Co. The state estimates the refunds will be as much as $28 million, but Southwestern Bell says the total will be closer to $24 million.

The Kansas Corporation Commission expects $25 million in refunds to be awarded to customers in that state.

Vermont's Public Service Board is looking for a relatively small sum, between $600,000 and $900,000, to be refunded to custom-ers. In addition, the Iowa Commerce Commission has not issued any figures but expects refunds to be ordered.

Michigan Bell has agreed to refund customers $37.7 million in overearnings and will set aside an additional $20 million in its depreciation reserve account.

Pacific Northwest Bell may have to refund between $73 million and $100 million, but the company has warned users that the cost of borrowing money to fund such refunds could raise rates. The company said customers may wind up paying $2 for every $1 refunded.

▶ STANDARDS

Approval of X.400 specs looms

COS' influence felt directly for first time in standards setting.

BY MARGIE SEMILOF
Senior Writer

WASHINGTON, D.C. — The appearance of off-the-shelf products based on X.400 message-handling protocols may be imminent if the final X.400 specifications are approved at a plenary session of the National Bureau of Standards (NBS) scheduled for July 24.

Development of the X.400 specifications is significant because it represents the first standards-making project directly influenced by the Corporation for Open Systems (COS).

Recently, NBS issued to COS a final draft of the X.400 specifications, which members of COS' X.400 subcommittee have moni-tored over time ("NBS, COS join forces," *Network World*, July 7). Representatives of COS member companies are expected to participate in a teleconference slated for today, during which they will discuss the proposed specifications and issue their recommendations to NBS. Although NBS will consider any suggestions made by COS, final approval of the specifications rests solely with the NBS.

X.400 a high priority

Earlier this year, COS asked NBS to place a high priority on finalization of the X.400 standard, as well as proposed specifications for file transfer access and management (Ftam).

As a result, NBS moved up the completion dates for both projects.

NBS is expected to wrap up the Ftam specifications immediately following the X.400 approval process. The Ftam specifications are designed to allow users to access and exchange files on different computer systems. Eight additional specifications are expected to be completed in the next few years, according to Karl Litzenberg, vice-president of information services at COS.

Robert Blanc, director of computer systems engineering at NBS, said COS will be an important force in the standards definition process. In addition, many of COS' vendor members are likely to move quickly in developing products based on the specifications.

The real job of COS, however, is not standards development. The organization will primarily develop suites to test products using Open Systems Interconnect (OSI) model protocols, once manufacturers begin building to completed standards.

Testing facilities delayed

Development of such hardware and software testing facilities has been delayed because COS attention was diverted by the standards specification activity sooner than expected, Litzenberg said.

Litzenberg said the test suites will be completed by year end. Until then, product testing will be handled by outside companies. COS has issued requests for proposals to several of these firms to develop test suites that will be used until COS facilities are ready.

"We hadn't planned on testing products until the end of 1987," he said. "We changed our direction and decided that development momentum was more important — even if we have to get outside help in testing."

Neither NBS nor COS actually develop standards. Both groups strive to define specifications within standards proposed by the International Standards Organization and the Consultative Committee on International Telephony and Telegraphy. ◩

▶ SATELLITE TECHNOLOGY

Nasa airs "Switchboard in Sky" plan

BY KARYL SCOTT
Washington, D.C. Correspondent

CLEVELAND — The "switchboard in the sky" is how the National Aeronautics and Space Administration (Nasa) refers to an experimental communications satellite scheduled for launch in 1990 that could rival fiber-optic transmission systems in cost and performance.

According to Nasa, the Advanced Communications Technology Satellite (Acts) will pioneer work in optical laser transmission, on-board switching, multibeam antennas and Ka-band satellite communications.

The Acts program, which was founded in the late 1970s with the aim of exploring new technologies, has often teetered on the edge of extinction due to federal budget cuts, but Congress has rescued it from the brink several times. The Reagan administration attempted to cut funding for the program last year and again this year, but the U.S. House of Representatives Committee on Science and Technology voted to restore the funds. The committee has slated some $95 million in Acts funding for the upcoming fiscal year. The item will be decided on by the entire Congress when it approves a budget this fall.

If all goes as planned, Acts could be in orbit by mid-1990, according to Nasa officials. "The object of Acts is to assist in the development of new technologies that will benefit the government and the marketplace," said Ron Schertler, Acts project experiments manager at Nasa's Lewis Research Center here. "The Japanese and Europeans have been working in this area, and with those governments funding the projects, the U.S. stands to lose its current technological leadership."

One of the most unique aspects of the satellite would be its on-board switching of communications signals. The switch, being developed by Motorola, Inc., will be similar to the AT&T 4ESS switch found in telephone company central offices, Schertler said.

RCA Corp. is the prime contractor for the $280 million project and will build the satellite. TRW, Inc. is a subcontractor to RCA and will provide transmitters and receivers. Communications Satellite Corp., another subcontractor, will develop the smaller end-user earth stations and the master earth station that will serve as a traffic controller on the network. The Massachusetts Institute of Technology's Lincoln Labs is developing the laser transmission modules under funding from the U.S. Air Force. Nasa's Goddard Space Center will develop another transmission package using radio frequency (RF) technology. The two will develop a communications link between the optical laser and RF systems.

Acts will employ multibeam antennas that produce thin beams of light capable of scanning the earth. The antennas are not fixed on a wide geographic region as with current satellite technology. The transmission beams are directed to narrow, specific geographic regions. Data can be transmitted through the network at 220M bit/sec, while voice can be transmitted at 64K bit/sec. ◩

▶ PC EXPO

Communications tools star at PC industry gala

BY JIM BROWN
New Products Editor

NEW YORK — Local-area network file servers and personal computer communications packages were among the bevy of products announced at PC Expo here last week.

Lotus Development Corp.'s unveiling of software that allows personal computer users to access mainframe data captured much of the new product attention at the show (see "Software lets PC users access mainframe data," *Network World*, page 2).

As expected, Novell, Inc. announced it will market a $650 Ethernet interface board made by the Boxborough, Mass.-based Micom-Interlan, Inc. ("Ethernet links bolstered," *Network World*, July 7). The firm also unveiled an upgrade to its Netware Systems Network Architecture Gateway, which supports communications between IBM mainframes and workstations linked to a server running the company's Netware operating software.

The board-based product now allows users to toggle between mainframe and personal computer sessions, boasts increased communications speed to 19.2K bit/sec and supports file transfers between workstation and mainframe.

This fall, Novell also will release the second version of its System Fault Tolerant (SFT) Netware operating system, Craig Burton, vice-president for product development and corporate marketing, told *Network World*.

In its currently available incarnation, SFT Netware ensures data is not written to faulty disk sectors. The second release will automatically create duplicate copies of data and implement a Transaction Tracking System that will stop data update procedures if error conditions are detected.

Corvus Systems, Inc. introduced its $9,795 Omniserver Professional 75 file server, which is an enhanced version of the Omniserver Professional 40 announced earlier this year.

The new offering increases main memory to 1M byte from 640K bytes and hard disk storage capacity to 74M bytes from 43M bytes. The server runs on Corvus' twisted-pair-wired Omninet local-area network.

Corvus also announced it will implement Novell's Advanced Netware operating system on Omninet, a move that will allow Omninet to support up to 100 users, up to four different network topologies and automatic print spooling. A 100-user version of Omninet's Advanced Netware operating system will list for $1,595.

Gateway Communications, Inc. introduced G/Net Plus, an enhanced version of its G/Net base-band coaxial local net. Features added include a board-based bridge to connect two local net segments, support for subnetworks and gateway software supporting communications with remote devices. G/Net Plus ranges in price from $1,895 to $2,095 for every two connections.

In another move, the company announced the $1,440 G/Async expansion board that turns an IBM Personal Computer AT into a communications server. Up to four G/Net Plus-connected workstations can share communications ports and modems at 19.2K bit/sec. Communications software provided with the device supports file transfers, terminal emulation and connection to all local net resources for a remote personal computer.

Ungermann-Bass, Inc. took the wraps off memory-resident software that allows personal computer users to toggle out of an application to make connections to printers, additional applications or other shared devices on Ungermann-Bass' Microsoft Corp. MS-Net-based Net/One local-area network.

Called the Connection Manager, the $100 package also allows users to move from a personal computer application into a terminal emulator to access network-connected minicomputers, modems or X.25 public packet networks. ▨

▶ PC EXPO 2

Users rap IBM links

BY JIM BROWN
New Products Editor

NEW YORK — According to some users attending PC Expo here last week, IBM still has a way to go in providing adequate connections between its personal computers and its larger systems.

Users surveyed by *Network World* said IBM may provide links from its personal computers to its larger systems, but has yet to offer products that really capitalize on those connections.

"So far they haven't made anything I can use," said Eric Cronin, senior system officer for New York-based Citicorp Financial Services.

Users, Cronin said, are looking for tools to allow them to download mainframe resident data to their personal computers. IBM can provide such tools, but doesn't offer the software needed to download the data in usable form. "Users' needs are beyond hardware," Cronin said. "IBM products have been nothing special."

Robert Palmeri, assistant controller for New York-based Bankers Trust Co., agreed with Cronin.

> *"IBM products have been nothing special."*

"We've had problems with IBM," Palmeri said.

"We pulled out all our IBM 3270 Personal Computer emulation adapter boards and installed [Digital Communications Associates, Inc.] Irma boards."

Palmeri said data was being lost when users toggled from personal computer applications to IBM's board-based terminal emulator. He said the problem has lessened since his firm started using the Irma boards.

Daniel Garrett, systems coordinator for Des Moines, Iowa-based Bankers Life Co., has been looking for products to support multiple shared access to mainframe resident data bases from personal computers. But he has found that IBM's TSO mainframe software supports access for only one personal computer user at a time.

"What we need, and what we haven't gotten, is multiple access to a common data base," he said. Garrett ultimately hopes to find a way to give 150 personal computer users the ability to concurrently upgrade mainframe data base files from personal computers. ▨

States from **page 3**

Many of the PUCs are currently holding hearings on the refund issue. They must decide how the BOCs will implement the refunds and the exact amount to be refunded. Among the questions to be resolved is whether the BOCs should refund money directly to customers, credit customer accounts or reduce future telephone rates to compensate for the overcharges.

While the refund question is the most immediate issue facing state PUCs, the high court's backing of state telecommunications policy-setting authority could have broader ramifications. States may begin to exercise greater authority in areas such as access charges, interconnection of public and private networks, separate subsidiary rules, inside wiring and accounting measures — all of which have come under FCC rule-making authority.

The Supreme Court decision, "could signal a tremendous shift in authority back to state commissions," said Alan Baughcum, a telecommunications analyst in the Washington, D.C. utilities consulting company R.W. Beck. ▨

▶ STRATACOM, INC.

Early users hail T-1 mux

BY JOHN DIX
Senior Editor

Early customers of StrataCom, Inc. had little but praise for the young company's new T-1 multiplexer and its unique packet technology. The customers commended the voice quality of the Integrated Packet Exchange T-1 Network Management System (IPX) and said it was cost effective and, thus far, reliable. The one criticism of the box concerned the relatively inefficient way it supports data communications.

Joske's, a retail chain with 27 department stores in Texas and a unit of Allied Stores, installed an IPX in Dallas and another in San Antonio roughly three weeks ago. Voice channels are passed through the multiplexers to two Rolm Corp. private branch exchanges, but for all intents and purposes, the IPXs are idle, said John Paul Jones, vice-president of store operations. The

Rolm switches, which are outfitted with T-1 interfaces, view the T-1 span as they did before, even though the IPXs are packetizing voice on the T-1.

The IPX's capabilities will really be put to the test in August when another T-1 interface will be added to each Rolm switch and the IPX multiplexers will be used to drive 48 voice channels over the single T-1 span, Jones said. In early 1987, the system will be further taxed when Joske's adds data support to its multiplexer. If the product continues to prove reliable, the company will add another node in Houston at that time.

"We will then have a full triangle network with link redundancy and the ability to route around failed links," he added.

The IPX has worked flawlessly for Joske's, the vice-president said. "We haven't had a minute of down time." The only functional problem he can anticipate stems, oddly

enough, from the music-on-hold feature the company has on its Rolm switches.

Joske's runs credit authorization checks across the T-1 span, and music is played when employees are put on hold while transactions are processed. Music-on-hold reduces the IPX's full 96-channel capacity because, unlike speech, it does not leave the silent gaps the multiplexer normally fills with voice packets (see "T-1 mux bows," page 1). Statistical multiplexing of voice packets is responsible for half of the device's 4 to 1 voice compression capability.

While the IPX's channel capacity is large enough for Joske's to use music-on-hold most of the time, during the crush of holiday shopping when extra channel capacity would be required, Jones said he will have to turn off the music.

StrataCom's other user, which asked not to be identified, is a California department store chain, which uses the IPX at its maximum 96-channel capacity. The store was operating two T-1 spans at 48 channels, twice their normal capacity, using special add-on equipment from another vendor. When the

IPX was installed, all the channels were compressed onto a single span and the second T-1 link was disconnected. The confidence this showed in the product even surprised William Stensrud, vice-president of marketing and strategic planning.

"The IPX provided a cost-effective way to support 96 channels," a spokesman from the chain said. "An added benefit was the network management tools that come along with it."

This user is particularly pleased with the on-line bit error rate test feature and the ability to perform hardware audits remotely. These audits enable the user to gather information about remote line cards, which ones can be revised and how.

The one weakness the spokesman found with the box is inefficient data support. "If you only need to support a 2,400 bit/sec channel, you still have to dedicate a full 64K bit/sec channel to the task," he noted. StrataCom has assured the user it is working to rectify that shortcoming. The IPX, which provides "very high quality voice support," will pay for itself in one and a half years, the customer estimated. ∅

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a 30% ownership of Telenova, Inc., a maker of small voice/data switches, a local network called Wangnet, and a nationwide packet-switched network called WangPac.

Together these communications components are intended to help the company achieve its primary goal: to convince users to put Wang products on desktops or install Wang applications that other desktop workstations can access, said Paul Demko, vice-president of data communications and networking. Voice support plays an important role in Wang's strategy, which mimics the strategy of IBM and its buyout of switch maker Rolm Corp.

Wang's first voice products surfaced last March when the Wang Integrated Office Solution (Wios) was announced. Wios links Wang's VS minicomputer to the Wang Business Exchange, a renamed Telenova switch that supports between 10 and 100 lines.

Wios will enable Wang to sell complete office systems to small users, Demko said. The switch can be a hub for telephones and Wang workstations alike, and it supports voice and text messaging. It may also eventually make text-to-speech messaging possible.

But perhaps the most important benefit of Wios is that the Wang processor controls the switch. VS, for example, can be used to gather call detail data and generate reports about phone and communications facility use.

Although the sole supplier idea behind Wios falls down in large companies because of the multivendor environment, Wang will attempt to capitalize in this market on the integration of its processors with Intecom switches. Intecom's switches range in size from 1,000 to 20,000 lines.

"The VS could manage station moves and changes, be used to

maintain directories of telephone and data processing users and equipment and enable both systems to be administered from a single workstation," Demko explained.

Tightly coupling processors and switches will eventually make it possible for Wang to develop what Demko calls voice-smart applications that integrate voice with data, graphics and video. Wang's Network Application Interface, a programmer's tool kit that simplifies the task of building applications to Wang network specifications, is being enriched to aid in the development of such applications.

Wang's answer to customers wary of using PBXs to support data devices is Wangnet, a broadband local network that accounted for $44 million of the company's fiscal 1985 revenue of $2.6 billion. Wang claims to have installed 1,400 Wangnets, supporting 140,000 devices, not all of which are Wang's.

Wangnet was released in 1981 as a proprietary network. While it will retain its role as a network for terminal-to-host and host-to-host communications, Wangnet will evolve into a backbone network. Demko said Wang intends to support industry standard departmental local networks such as IEEE 802.3 Ethernet-like nets and possibly IEEE 802.4 token-passing bus networks as specified for use in factory automation. IEEE 802.5 token-ring nets will not be supported.

Today Wangnet can support Ethernet devices on a dedicated frequency band. But the band used to support Wang workstations, the Wangband, is not fully IEEE 802.3 compatible. Demko said the company intends to make Wangband compatible by the end of the year in preparation for linking Wang equipment directly with devices from Digital Equipment Corp. and other vendors that support the IEEE 802.3 standard.

Wangnet will not support IBM's IEEE 802.5-compatible Token-Ring Network because there is no effective way to implement the network's ring topology on the branching tree topology of Wangnet. The company has pledged to offer interfaces to IBM's Token-Ring Network in order to sell its VS processor as a file server for that network environment.

During the last year, a customer revolt forced the company to consider an alternative to Wangnet with which to replace the twin coaxial cable normally used to wire its systems. "Customers demanded the ability to support Wang workstations on twisted-pair wire," Demko said. "They said they wouldn't do business with us otherwise," he added.

Wang developed the Enhanced Asynchronous Device Controller to answer the cry for twisted-pair wire. This device made it possible to use telephone-type wire to extend Wang workstation functionality to standard asynchronous Ascii terminals. Support for these terminals gave users an inexpensive alternative to Wang workstations, but it did not give users a twisted-pair wire option for their installed base of Wang terminals. They still must be supported with normal twin coaxial cable or with Wangnet.

Wang Systems Networking architecture comes into play above the physical and data link level networking concerns addressed by Wang's PBXs, local networks and twisted-pair wire options. Two forces are shaping that architecture today: IBM's Systems Network Architecture and the Open Systems Interconnect (OSI) model.

In the last two years, Wang has lagged behind archrivals DEC and Data General Corp. in delivery of IBM interconnect products. Last month, Wang announced an IBM

LU 6.2-compatible interface for its bridge to IBM's Disoss. It was a first step in the company's effort to restore user confidence in its ability to deliver IBM-compatible products. Future plans call for Wang to support IBM's SNA Distribution Services (Snads). Snads would enable a Wang VS to communicate with an IBM System/36 without being routed through a host, Demko said.

Long-term plans call for Wang Systems Networking compatibility with OSI. While Wang and others in the industry are migrating to OSI, they still must offer customers a high degree of functionality. "The manner in which vendors provide rich features within their networks is very different today. Standards are coming from the bottom up." Demko believes it will be three to five years before standards address higher level network issues.

One area in which Wang differs from its competitors is in the offering of wide-area communications services.

Perhaps its most interesting subsidiary is WangPac. WangPac is a 60-node packet-switched network that was originally built to tie together Wang's 50 domestic and 10 international offices, according to John Sawyer, director of network services. Six months ago, the company began selling excess network capacity to Wang customers.

Although only a small portion of the network's capacity is used for customer support today, Wang is attempting to sell end-to-end network systems that include Wang equipment at both ends and the long-distance link in between. "We can offer keyboard-to-keyboard service," Sawyer said. "We can support the lines, modems, operating systems and applications." This would provide customers with a single point of contact for maintenance of the whole network. ∅

StrataCom from **page 1**

venture capital-backed multiplexer maker, in a $28-million deal ("DCA widens its piece of the T-1 pie," *Network World,* July 7).

The Integrated Packet Exchange (IPX) T-1 Network Management System can support up to 96 toll quality voice channels over a single T-1 digital link, as opposed to the usual 24 or 48. Fully configured, an IPX can support 40 T-1 lines.

Besides increased channel capacity, the IPX boasts an internal cross-connect feature, enabling individual channels within composite T-1 links to be switched from one T-1 port to another without demultiplexing. The IPX also offers N+1 component redundancy, which provides one spare component for each multiplexer element. On-line network management capabilities enable a network of IPXs to be monitored for local and remote alarms.

Although compatible with standard T-1 transmission facilities, the IPX differs from other multiplexers in the way it employs the 1.544M bit/sec digital bandwidth for internodal communications.

The IPX, like other T-1 multiplexers, conforms to AT&T's D4 framing standard. A D4 frame contains 193 bits — a 192-bit data field and a single synchronizing bit. This digital stream is sampled as it is received at 8,000 times per second, which, when multiplied, equals the 1.544M bit/sec T-1 rate.

StrataCom, however, does not employ the D4 formatting typically used with D4 framing. That format breaks the 193-bit D4 frame into 24 eight-bit channels and one synchronizing bit. This provides the 24 64K bit/sec channels standard in the industry today. Instead of segmenting the 193-bit frame into channels, the IPX uses each frame as a single data packet, explained William R. Stensrud, vice-president of marketing and strategic planning.

The IPX supports standard T-1 framing and formatting for devices that have T-1 interfaces.

The system is able to support 96 voice channels over a single T-1 span because voice packets are only transmitted when needed. StrataCom maintains that the average user only speaks 40% of the time in a conversation. The IPX can fill the gaps with voice packets from other conversations. This gives IPX a 2 to 1 voice compression, enabling it to support 48 voice links over a T-1.

That capacity is doubled again to achieve the full 96 channel capacity by employing Adaptive Differential Pulse Code Modulation.

Data support with the IPX is made possible with subrate modules. Network management features include the ability to use a control terminal attached to a single IPX node to execute control and configuration commands for any other node. The device's automatic rerouting features enable the multiplexer to route around failed links in less than five seconds, Stensrud said.

The IPX costs $14,990 per node in its smallest configuration. An IPX configured to support 40 T-1s would cost $250,000.∎

User to swap leased lines for Vsat network

BY BOB WALLACE
Senior Writer

ST. CHARLES, Mo. — Central Area Data Processing (CADP) is replacing its nationwide leased-line network with a two-way, very small aperture terminal satellite network designed to facilitate data communications between some 120 rural electric cooperatives and CADP's corporate headquarters here. Once operational, the Vsat network is expected to save the company between $240,000 and $320,000 a year.

CADP staff technical analyst Lee Backhorst claimed the company chose to install a Vsat net instead of expanding its leased lines because the company needed a less expensive and more reliable network capable of handling a dramatic increase in data traffic over the next five years.

RCA American Communications, Inc. of Princeton, N.J., and Advanced Communications Engineering, Inc., of Palm Bay, Fla., joined forces to win the contract from eight other Vsat service providers. RCA Americom will provide the transponder space for the network as well as operations and maintenance services. Advanced Communications will provide the 1.8-meter

Vsat dish antennas and a handful of 3-meter Vsats to be used in the network. Rural American Communications, Inc., a wholly owned subsidiary of CADP, will manage the satellite system.

Backhorst said the projected savings from the Vsat net, due to be completed in October 1987, represent roughly 18% of the company's current communications outlay. Backhorst declined to expand on a plan under consideration to run a large distributed application via the satellite net that would require the acquisition of several thousand additional Vsats.

CADP's decision to install a Vsat network partially lays to rest the common misconception that only large corporations with at least several hundred potential network locations can afford these systems.

The CADP Ku-band network will allow numerous rural electric cooperatives to perform a variety of data processing applications. The cooperatives will be able to perform data inquiry and uploading, extract information from corporate data bases to be used in reporting and support transaction processing using the Vsat net.

Backhorst claimed increasing rates for leased lines made the network switch necessary. "Even

though long-distance charges have been decreasing, the cost of leased lines everywhere in the country has risen," he explained. A second incentive for the Vsat network was the unreliability of the leased lines, Backhorst said. "We were suffering from a lack of reliability at these facilities. We are planning that the Vsat network will give our users 99% communications link availability. Currently, the availability of our leased line is somewhere in the 70% range."

Backhorst added that the huge projected increase in data communications traffic between the cooperatives and CADP's headquarters necessitated the switch from leased lines to Vsats.

"We expect network traffic to increase 15% to 20% annually. We would not be able to accommodate this traffic over terrestrial services," he explained.

Because Vsat technology has yet to mature fully, Backhorst acknowledged there are risks associated with the venture. "Although many users have opted for Vsat nets, nobody really has a large network in place at present," Backhorst explained. He said the company viewed numerous Vsat system demonstrations and claimed the Advanced Communications-RCA offering performed best in CADP's technical review.

Backhorst cautioned users considering implementing Vsat nets to first learn about Vsat technology. "This will allow the company to make a wise technical decision," he said.∎

User chooses fiber path
Coaxial cable snubbed for inflexibility.

BY BOB WALLACE
Senior Writer

FERNDALE, Wash. — Intalco Aluminum Corp. was thinking of the future when it chose fiber-optic cable over its coaxial counterpart to handle data traffic at the firm's 300-acre aluminum refinery here.

Dave Earley, MIS manager for Intalco, claimed fiber-optic cable will provide the company with greater flexibility in supporting future applications than would coaxial cable. "If you use coaxial cable, you have to know what applications it will support so you can select the proper type of coaxial cable," he explained. "With fiber, we didn't need to know what future uses of the medium would be. We want the flexibility to support high-speed communications and video applications. We didn't want to have to reinstall coaxial cable for additional applications."

In addition to data transmission, the fiber cable is used to control Intalco's process manufacturing line, which pumps out approximately 280,000 tons of aluminum annually. Some 15,000 meters of fiber-optic cable carry asynchronous data from more than 200 terminals,

printers and other peripheral devices to the facility's data center.

Earley claimed the fiber-optic cable's immunity to interference made it the logical choice for use in the plant. "Because we have large magnetic and electrical fields in this facility, coaxial cable was almost out of the question for us," he explained.

While detractors of fiber cable claim it is difficult to install without breaking the medium's glass fibers, Earley said Intalco's installation of the fiber cable was completed without a single instance of damage. The MIS manager configured the network, and Fibronics International, Inc. of Hyannis, Mass., supplied the fiber and lightwave multiplexers and performed the actual wiring of the refinery. The system, which became operational last December, cost Intalco roughly $150,000. Earley did not estimate the cost of a similar coaxial cable installation.

Earley said users' perceptions of fiber being costly and difficult to install are untrue. "I think the fear people have of fiber is unfounded," he said. "Our electricians have not had any problems hooking equipment to the fiber." Coaxial cable is

not necessarily less expensive than fiber-optic cable, he claimed. "If you talk to users who have installed coaxial cable in their facilities, they will say the coaxial cable didn't cost too much, but they sure spent a lot of time trying to make their [coaxial cable networks] work," Earley noted.

Radio frequency signals transmitted over coaxial cable nets must be balanced, and the network itself must be properly grounded.

Intalco's data communications employs a star-shaped configuration. Each terminal, printer or other peripheral is hooked to the Fibronics fiber multiplexers with RS-232 cable. The multiplexers send the asynchronous data over the fiber stretches to other fiber-optic multiplexers located in the same building as Intalco's private branch exchange.

Those multiplexers take the information off the fiber and route it over RS-232 cables to either the data processing center or the process control center. The site's DP center houses a Prime Computer, Inc. 99/55 superminicomputer, several Data General Corp. Nova 1200s and a single DG MV 2000, Earley said.

Intalco's fiber-optic cable offers roughly 400M bit/sec of bandwidth. The fiber-optic multiplexers use only 20M bit/sec of that available capacity. As many as 128 terminals can be connected to a single Fibronics multiplexer, Earley noted.∎
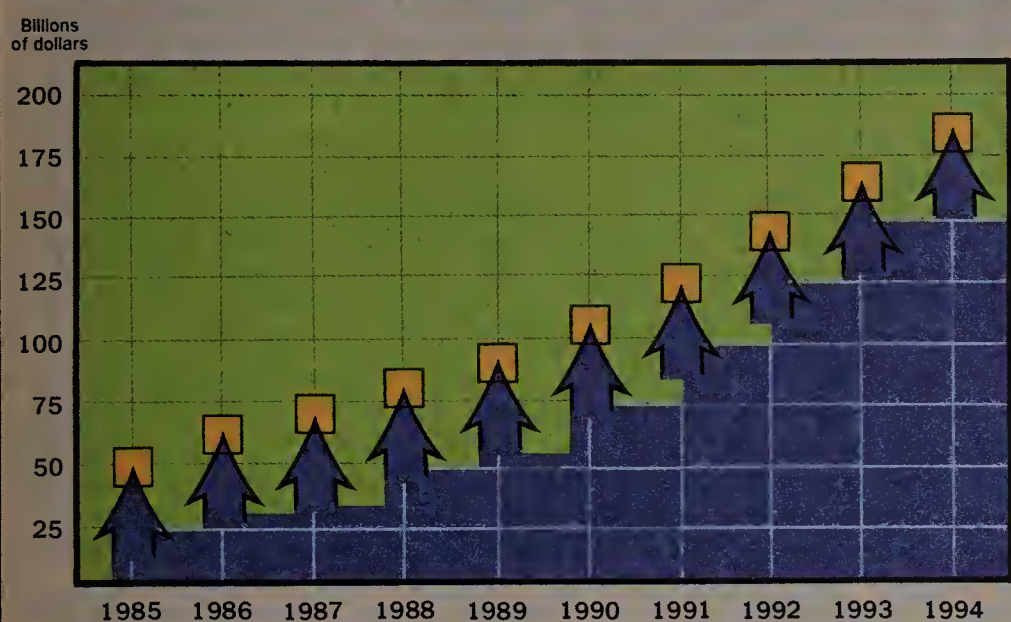
INDUSTRY UPDATE

AT&T consolidates marketing divisions

AT&T announced last week that it is combining the marketing groups of AT&T Communications, Inc., the company's long-distance unit, and AT&T Information Systems, the arm of the company that manufactures and sells communications and data processing equipment.

As of Sept. 1, marketing operations in the western U.S. will be combined under the leadership of Business Markets Vice-President Tom Cross. The 45-year-old Cross, who started with AT&T at AT&T Bell Laboratories in 1963, works out of AT&T regional headquarters in Oakland, Calif.

IBM total revenues forecast 1985-1994

Billions of dollars

Bar values: 200, 175, 150, 125, 100, 75, 50, 25

Years: 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994

SOURCE: FROST & SULLIVAN, INC., NEW YORK

▶ HAYES MICROCOMPUTER

Asynch X.25 plan proposed

BY MARY PETROSKY
West Coast Correspondent

NORCROSS, Ga. — By proposing a revision to the X.25 packet-switching protocol, Hayes Microcomputer Products, Inc. is trying to short-circuit other vendors' efforts to establish asynchonous error-correcting protocols used to access synchronous packet-switched networks.

The company's proposal was made to the U.S. Consultative Committee on International Telephony and Telegraphy Study Group D Modem Working Party. In a prepared statement, Hayes said X.25 could be modified to enable asynchronous personal computer users to access synchronous X.25 networks by adding an asynchronous framing technique known as X.25/AFT.

Enhancing the existing X.25 protocol to provide asynchronous network access, instead of supplementing it with another protocol, would simplify the return to synchronous protocols in the future. The company argues that synchronous protocols will eventually be standard for personal computers.

AFT would adapt X.25 to support asynchronous communications by replacing the lowest level bit-oriented High Level Data Link Control framing technique used today with a character-based asynchronous framing technique. Higher levels of the X.25 protocol would be unchanged.

At the heart of the proposal is the search for a way to provide error-free asynchronous dial-up access to synchronous X.25 networks. While X.25 packet networks provide robust error detection and recovery within the packet realm, the dial-up links used to access the nets are prone to errors.

One vendor that takes issue with Hayes' proposal is Tymnet, Inc., a McDonnell Douglas Network Systems company that operates a public packet network. Hayes' AFT does much the same thing as the X.PC protocol promoted by Tymnet, according to Steve Y.R. Kim, X.PC product specialist at Tymnet. X.PC is a packet-oriented, asynchronous protocol modeled after X.25. It provides error protection, multisession capability and throughput comparable to X.25, as well as the ability to convert to X.25, Kim said.

"One problem with AFT is that [Microcom Networking Protocol] and X.PC are already using a different standard for asynchronous communications. In comes Hayes with this recommendation, two years after MNP and one year after X.PC have been available," Kim said. "The major issue many standards organizations take into account is: Is something available today, and does it work?" ∎

INDUSTRY EYE
PAUL KORZENIOWSKI

The honeymoon is over for IBM

IBM's days of wine and roses are going sour. Last month, chairman John F. Akers told security analysts that the company's annual profits will drop this year.

The company has set lofty revenue growth goals — $100 billion by 1990 and $150 billion by 1995 (see chart above). The goals are starting to look unattainable, so IBM is taking a number of cost-cutting measures to keep those goals in view.

Michael F. Geran, vice-president of research with E.F. Hutton Group, Inc. in New York, noted, "When revenues dip, a company has to respond. Cutting costs is a suitable response until finances get straightened out."

The company plans to rely on attrition to trim its work force. It will end the year with fewer employees than it had when the year began, a situation that has not occurred since 1975. Staff cuts will be felt more in corporate headquarters than other areas, for the company has said it plans to increase its marketing and sales staffs.

Big Blue also plans to reduce travel and education expenses. Research and development budgets will also be trimmed, a situation that could adversely impact many companies. IBM has been busily working on a number of projects to link its incompatible systems. This type of work requires massive amounts of time and manpower. Cuts will obviously slow product development. This means that IBM, which has traditionally been late entering many market segments, may be even more sluggish in this regard.

Slow sales are the principal reason that the measures are needed. Analysts said that inventory is at an all-time high because a number of products are selling well below expectations. IBM is taking some steps to increase sales. As Akers was presenting the gloomy financial picture, the company was preparing its largest product barrage in history. More than 125 products were announced in one fell swoop.

The plethora of announcements was the first in a series of product introductions. Analysts said that the company will announce more than 1,000 more products by the end of the year.

Many of the products in the first wave were prematurely announced. Some will not be available until the end of this year or the beginning of next year. So what's the rush? IBM had been losing business to small companies better able to respond quickly to market demands. By preannouncing its products, IBM may be attempting to freeze key market segments.

Another way to improve the revenue picture would be by gaining a foothold in rapidly growing markets. Rather than develop products in-house, IBM has opted to acquire companies in emerging markets. For example, by purchasing Rolm Corp., IBM instantly became a major player in the private branch exchange game.

However, gaining a foothold does not translate into an immediate increase in profits. Reports indicate that Rolm has done little more than break even since the IBM acquisition. IBM may have approached Rolm at a time when the company was just starting to backslide. Companies that can do a lot better than simply breaking even may resist an IBM takeover.

IBM may not be interested in certain rapidly growing markets that are small. The company has an unwritten rule that it will only enter markets with at least $200 million in annual revenue. A number of communications markets are close to that level. For example, IBM has been reportedly eyeing the packet assembler/disassembler, T-1 multiplexer and central office switch markets.

However, none of these agreements would reap the kind of windfall that IBM apparently needs to reach its goals. IBM's financial problems mirror those of other vendors, as last year's industry slowdown has plodded along well into 1986 with no end in sight.

► INDUSTRY MOVES

DG and switch maker reach maketing accord

DTI to merge systems with Eclipse minis.

BY PAUL KORZENIOWSKI
Senior Editor

WESTBORO, Mass. — Data General Corp. recently reached a marketing agreement with Digital Transmission, Inc. (DTI) that enables DTI to integrate its line of switching systems with DG's Eclipse MV/Family of superminicomputers.

DTI's 585 line supports voice and data transmitted simultaneously over telephone wiring. The equipment does not require additional modems or wiring. DG has certified the equipment for use with almost the entire Eclipse MV/Family.

Three years ago, DTI, based in Lombard, Ill., purchased the commercial rights to Rockwell International Corp.'s line of private branch exchanges and automatic call distributors. Rockwell had sold approximately 300 systems, primarily to government agencies. DTI decided to develop commercial markets for what came to be called the 585 product line.

Last year, DTI had sales of $4.5

million, an increase of more than 125% of its 1984 sales.

By linking its products to DG's superminicomputers, DTI is now able to supply its customers with full departmental systems. DG has been making inroads into large corporations through the success of its CEO office automation software. Some users were looking for departmental switching systems as well as departmental computer systems and, with the DTI offering, DG is now able to offer its customers that combination.

> **"Last year, DTI had sales of $4.5 million, an increase of 125%."**

DG has been aggressively pursuing a number of communications markets. In December, the company purchased United Technologies Corp.'s Integrated Digital Network division, which was developing a new line of voice and data PBXs.

In May, it made a minority investment in Dama Communications Corp., a Parsippany, N.J.-based common carrier. Those two moves were seen as the first steps in a process that could see the minicomputer manufacturer evolving into a common carrier.∎

► LEGAL MOVES

Firm sues industry giants

BY KARYL SCOTT
Washington, D.C. Correspondent

SAN FRANCISCO — American Telecorp, Inc. of Redwood City, Calif., last week filed suit against Bell Communications Research, Inc. (Bellcore) and a number of Bell operating companies and regional Bell holding companies, claiming violations of federal antitrust laws, misappropriation of trade secrets, deliberate fraud and unfair competition.

Ameritech, BellSouth Corp., Southwestern Bell Corp., Michigan Bell, Southwestern Bell Telephone Co., Southern Bell Corp. and South Central Telephone Co. are also named in the suit.

American Telecorp is a four-year-old company that develops and markets telecommunications software to telephone companies. American Telecorp developed a

product in 1983 called Cenpac, which it has sold to a number of the BOCs. American Telecorp attempted to market Cenpac to the companies named in the suit, but was unsuccessful in selling it to them.

Those firms signed nondisclosure agreements with American Telecorp in order to see how the software worked. American Telecorp charges that those firms violated the nondisclosure agreements and stole the trade secrets embodied in the product. All companies named in the suit now employ software similar to Cenpac, claiming either to have developed it on their own or to have purchased it from Bellcore, said American Telecorp President James Rohde.

Cenpac is Centrex-based software that allows users to reconfigure networks from premises-based personal computers without telephone company assistance.∎

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cal telephone companies were transferred to AT&T Information Systems after the divestiture of the leviathan communications company on Jan. 1, 1984.

Many attorneys, consultants and users claim the lease contracts are no longer valid because they were originally arranged through local telephone companies, not AT&T Information Systems.

The chasm between users and AT&T widened substantially as the result of a Los Angeles County, Calif., Superior Court ruling last month that enjoined members of the Pacific Consulting Group of Whittier, Calif., from advising AT&T Information Systems customers against paying the termination charges.

David Ritchie, general attorney for AT&T, said of the recent ruling, "Along with two previous state court decisions, the California court ruling demonstrates the total lack of validity in claims that AT&T's termination charges are not enforceable."

Richard Bleicher, an AT&T attorney, said AT&T is not eager to sue its customers. "But," he added, "when we enter into an agreement with a customer, they expect us to live up to our side of the agreement and, conversely, we expect the customer to live up to his side of the agreement. If a customer prematurely terminates such a contract and refuses to pay the termination charge, we will take appropriate legal action."

Bleicher said if a customer decides to switch to alternative AT&T equipment, the company will attempt to work out an agreement amenable to both sides.

Paul Daubitz, president of Associated Telemanagement, Inc., a Boston-based consulting firm, estimated that between 10% and 15% of AT&T customers have such long-term lease contracts.

"This is the type of marketing

that has cost AT&T a lot of credibility in the marketplace," he said. "AT&T cannot be enforcing the contract on one hand with one customer who wants to go to use a different vendor's PBX and not enforcing the contract with customers who want to buy AT&T equipment. This is outrageous."

Victor Toth, legal counsel for the 200-member New York-based Society of Telecommunications Consultants (STC), asserted that the legality of the termination charges has not been established. "It appears the [California] decision simply states that a person should not interfere with a contract," he said. "There has not yet been an expressed statement of legality, nor has there been an expressed statement of illegality of the contracts."

Brian Moir, legal counsel to the International Communications Association's Washington, D.C.-based Public Policy Committee, said the Federal Communications Commission ruled in April 1985 that the termination charge provision of AT&T's lease contracts was valid under the Federal Communications Act.

But he claimed the FCC's ruling on the termination charge did not address the legality of the long-term lease agreements themselves. "The FCC did not say the equipment lease agreements were valid contracts. What the FCC said was there was nothing in the documents that was contrary to FCC rules," he explained. "The FCC said the the contracts shoud be addressed at the state level."

Lee Hancock, a partner with Hancock and Hannon, Inc., a Seattle-based consulting firm, claimed at least a dozen of the firm's clients are currently considering terminating such leases and are deciding whether to pay the termination charges.
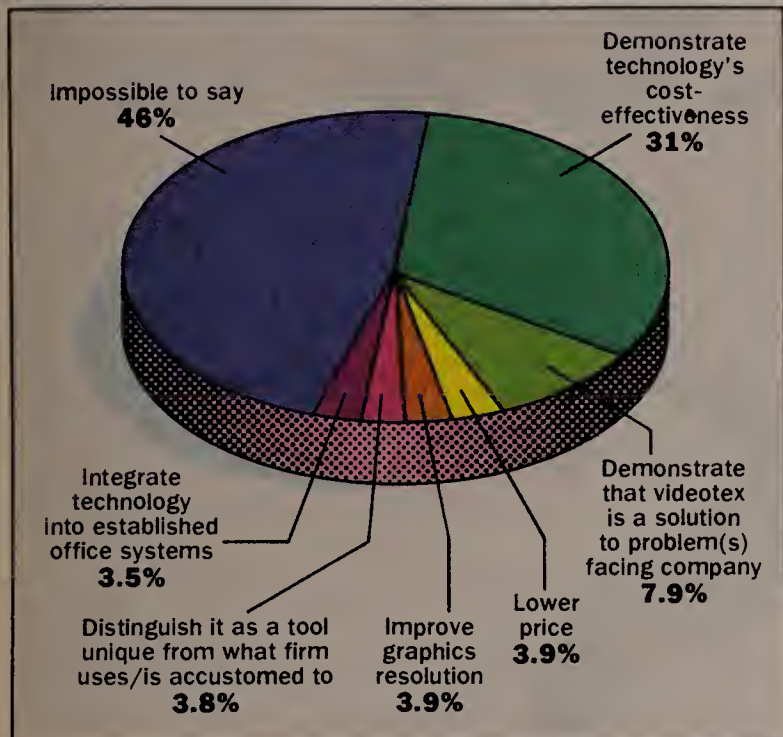
"The termination fees in these cases range from $10,000 to as much as $100,000," he claimed.∎

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the cost of telecommunications equipment. Moreover, its elimination would discourage investors from buying equipment and leasing it as a tax shelter.

While the change in tax laws may affect some lessors and lead to higher leasing costs, industry sources and analysts surveyed by *Network World* said users will continue to lease their telecommunications equipment.

"Leasing will become less a tax shelter game and more a straight economic game," said Richard Contino, chairman of ELM Corp. and an attorney specializing in equipment financing.

"In other words, leasing will have to produce more income, and lessors will have to rely less on tax write-offs and more on good business practice."

Contino said lessors are turning to the telecommunications market as other leasing markets become more crowded. Meanwhile, more users are leasing in order to meet their increasing need for sophisticated communications equipment.

According to Contino, users that have encountered problems borrowing from banks often are able to secure equipment funding from leasing companies more readily. Furthermore, he said, communications managers who have difficulty

justifying an expensive capital purchase can win upper management approval for a lease arrangement.

Robert Neagle, vice-president of communications at Tri Continental, a Paramus, N.J., equipment lessor, said some users historically have rented communications equipment and are more comfortable with leasing than purchasing arrangements.

Growing user acceptance of used telecommunications equipment may also help the telecommunications equipment leasing market by ensuring greater residual value for equipment after its initial lease, according to Greco.

Comdisco, Inc., a major player in the computer leasing market, began leasing telecommunications equipment several years ago. According to Robert Miller, senior vice-president for capital leasing at Comdisco, the company expects to do $500 million in telecommunications equipment leasing this year.

Miller said his company attributes much of its success to its ability to remarket equipment after an initial lease ends.

"It costs less to lease from us because we take a significant equity position in the equipment," Miller said. "When someone gives us back equipment, we can market it to someone else. Therefore, my residual risk is very low."∎

TELECOM TRENDS

GTE cuts over five-millionth line

GTE Communication Systems Corp. recently cut over a new GTD-5 EAX digital central office switch in Whittier, Calif., that brought the total number of GTD-5 lines in service to more than five million. The first GTD-5 went into service in June 1982. The one-millionth line cutover was August 1984. GTE says it has on order or is in the process of installing 2.6 million additional GTD-5 lines.

What will it take to sell commercial videotex?
(Percentage of potential users)

Impossible to say 46%

Demonstrate technology's cost-effectiveness 31%

Integrate technology into established office systems 3.5%

Distinguish it as a tool unique from what firm uses/is accustomed to 3.8%

Improve graphics resolution 3.9%

Lower price 3.9%

Demonstrate that videotex is a solution to problem(s) facing company 7.9%

SOURCE: VENTURE DEVELOPMENT CORP., NATICK, MASS.

▶ LONG-DISTANCE SERVICE

NY Tel seeks to stem bypass tide

BY JOHN DIX
Senior Editor

NEW YORK — New York Telephone Co. filed a proposal with the Federal Communications Commission two weeks ago aimed at stemming the bypass tide by increasing residential users' interstate telephone costs to provide lower priced service to business users.

The proposal could reduce business customers' direct dial and Wats interstate telephone bills by 11% to 60% and increase residential users' bills by as much as $1.23 per month.

Although the proposal follows FCC guidelines for alternative pricing plans, it has been the subject of controversy be-

cause it leverages the company's captive residential user base to offer discounts to high-volume users. New York Telephone argues that it needs these discounts to compete with bypass carriers that sidestep local telephone companies and connect business customers directly with long-haul carriers.

Under the proposal, local telephone company access charges now paid by long-distance carriers would be shifted to customers. The access charges would be billed according to a proposed tapered rate schedule that would provide bulk discounts based on long-distance usage. Long-distance carrier rates would be lowered to reflect the removal of the access charge.

CROSS TALK
JOHN DIX

Congress can't let telecom rest

Federal legislative attempts launched within the last five years have not been successful in leaving their mark on the telecommunications landscape.

This fact, however, hasn't discouraged Senate Majority Leader Robert J. Dole (R-Kan.).

He recently introduced legislation in the U.S. Senate that proposes transferring control of the former Bell operating companies from the Justice Department and U.S. District Court Judge Harold Greene to the Federal Communications Commission.

The first thing that comes to mind when legislators start talking about getting involved with the regulation of specific industries is the gross waste of time and money spent on past legislative failures.

Witness the Senate Telecommunications Competition and Deregulation Act of 1981 (S.898) and the House's answer, the 1982 Telecommunications Act (H.R. 5158).

S.898, also dubbed Bell Bill II, was introduced to the Senate in April 1981 by Sen. Robert Packwood (R-Ore.), chairman of the Senate Commerce Committee. This bill, written while AT&T was still embroiled in its ongoing antitrust suit, sought to deregulate AT&T broadly.

The bill was backed by the Reagan administration, AT&T and several important lobbying groups. In October

1981, the bill swept through the Senate but did suffer some major revisions.

The revised bill called for AT&T to establish a separate subsidiary to provide nonregulated products. It also proposed a deregulation schedule that would allow AT&T to begin offering nonregulated transmission services and suggested AT&T be required to buy a percentage of its equipment from independent suppliers.

Then the dam broke.

In January 1982, the long-standing AT&T antitrust suit was settled with the Consent Decree that required AT&T to spin off its operating companies. That settlement essentially gutted Bell Bill II and H.R. 5158, the House's answer to S.898, which was sponsored by congressman Timothy Wirth (D-Colo.), then chairman of the House Telecommunications Subcomittee.

But settlement of the AT&T suit didn't stop the legislative machine. The word around the Hill was that legislative solutions were still necessary for future policy-making decisions.

Similar in their folly

H.R. 5158 differed from S.898 in many regards, including different separate subsidiary requirements and terminal deregulation provisions. They were not, however, completely different and were probably most similar in their folly. While AT&T, the Justice

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▶ INTERNATIONAL NEWS

AT&T, IBM widen service horizons
Giants step overseas to expand.

BY JOHN DIX
Senior Editor

AT&T and IBM broadened their horizons earlier this month with the introduction of international data services.

Both companies are seeking to expand the area of coverage for existing services. AT&T is expanding a basic transport packet service, while IBM is adding access to overseas processing service centers to U.S. users.

Even though the services are of a different nature, an interesting aside in the growing turf wars between these two industry giants is that IBM is able to offer its international services at will, whereas AT&T must seek service approval from the Federal Communications Commission. The services were announced within two days of each other.

In its FCC filing, AT&T asked for approval to offer International Accunet Packet Service to Australia, Singapore, Hong Kong,

Spain and West Germany. If approved, the services would begin July 11.

Users connected to Accunet Packet Service in the U.S. will be able to access nodes on the public packet-switched networks in the foreign countries. Speeds supported range up to 9.6K bit/sec.

Service rates

Service rates include usage and connect time elements. Customers sending data to the proposed countries would be charged $8 per hour and $10 per kilosegment, which consists of 1,000 data segments ranging from one to 64 bytes. Accunet is available in 99 U.S. cities, the UK, France, Italy, Japan and Canada.

IBM's overseas service bid is made possible by linking IBM's domestic Information Network with the IBM World Trade Europe/Middle East/Africa Corp. network, which is based in the Netherlands and Japan. Both networks are based on

Digital has it now.

Introducing the DECconnect™ Communications System – the cost-effective way to give users every networking option they need, with snap-in ease. In a single wallplate, DECconnect gives you: a high-speed LAN connection using ThinWire Ethernet; a connection for terminals; a connection for telephones; and a connection for cable TV.

Now communications by voice, data and images can be integrated simply and cost-effectively at every user's workplace. With ThinWire Ethernet handling the high-speed data link, standard Ethernet LAN performance and functionality

A single company-wide communications system that lets you plug into voice, data and video as simply as this.

can be delivered at a greatly reduced cost per user. And ThinWire Ethernet's ability to communicate with other vendors' equipment ensures current and future compatibility. From planning to implementation, from installation to service, DECconnect adds up to the most flexible and simple-to-use communications system available today.

To find out how the DECconnect system can give you a competitive edge now, write: Digital Equipment Corporation, 200 Baker Avenue, West Concord, Massachusetts 01742. Or call your local sales office.

digital™

▶ CENTREX

Tool may oust 1A2
Users opting for Deka's Easyline.

BY JOHN DIX
Senior Editor

MILPITAS, Calif. — Users looking to replace those old, expensive and cumbersome AT&T 1A2 key systems used with Centrex may find a suitable electronic replacement in the Easyline from Deka, Inc., a company based here.

Deka equipment was recommended to Centrex users by a customer from Johns Hopkins Hospital in Baltimore at the recent gathering of the International Communications Association.

AT&T's 1A2 key systems have traditionally been used with Centrex as secretary stations to manage groups of phones within departments. A typical 10-button set, each button representing a line appearance, would enable a departmental secretary to pick up on anyone's calls and route them accordingly.

The 1A2, however, is clumsy because it is wired with 25-pair cable, is expensive to rent and costly to maintain. "Whenever you want to change line appearances, you have to call in the telephone company service man at $90 per hour," said Christopher Davis, director of telecommunications services at Rexnord Co., a diversified manufacturing company in Milwaukee.

By comparison, private branch exchanges use electronic sets supported with so-called skinny wire, typically a six-pair wire with a modular jack. Line appearances on the secretarial station can be changed by modifying switch software using an asynchronous terminal or personal computer, a procedure that typically can be done in-house.

Deka's Easyline EL400 provides Centrex users with many of the advantages of PBX electronic sets while retaining the familiarity of 1A2 use and basic functions.

Deka's Easyline EL400 supports four incoming lines and up to 19 stations. The unit has the usual row of lighted line buttons across the bottom, a hold and an intercom button.

The EL400 also offers single-button access for features like last-number redial, conferencing, mute and hang up. In addition, the set has a row of buttons running up the side that can be used for single-button dialing of up to 36 stored telephone numbers.

One of the beauties of the EL400 is that, unlike the KSU central control units needed with 1A2s, the EL400s stand alone, removing the possibility of a systemwide failure.

The EL400 is sold through distributors, including Graybar Electric Company, Inc., headquartered in St. Louis. The user from Johns Hopkins said the sets typically retail for $460, but in quantity he was able to get them for as little as $280 apiece.

Deka is located at 507 Valley Way, Milpitas, Calif. 95035.◪

The access charges long-distance carriers pay to complete interstate calls today average 7 to 8 cents per minute. The new customer access charge ranges from roughly 10 cents per minute for the first 60 minutes of use to less than 3 cents per minute for 20,000 or more minutes of use. The greater the usage, the lower the cost.

Residential customers who rarely make interstate calls would pay the heaviest penalty — a maximum monthly increase of $1.23. Customers who make a greater number of interstate calls would pay an average of 25 cents more per month, according to Patrick Garzillo, director of access service pricing for New York Telephone. Some 40% of New York Telephone's residential subscribers who do not make interstate calls would be unaffected by the proposal.

Discounts under the tapered rate schedule would be realized after 350 minutes of use per month. A midsize user company generating between 5,000 and 7,000 minutes of long-distance traffic per month could shave 20% off its net interstate service bills under the proposal. A larger customer with 30,000 minutes of interstate calling per month could save 60%, Garzillo said.

Parties interested in registering comments on the proposal must file them with the FCC by the end of the month. If approved, the alternative pricing plan could begin a one-year trial as early as Aug. 10. Garzillo said this implementation date is optimistic.

New York Telephone justifies the proposal as a necessary competitive response to the threat of bypass. Garzillo said New York City is a prime bypass market and, in addition to point-to-point bypass, many new long-distance services have provisions for direct connections.

AT&T's Megacom, GTE Sprint Communications Corp.'s Advanced Wats and MCI Communications Corp.'s Prism are high-volume services that can be accessed with dedicated facilities that link the customer directly to the long-haul carrier's network point of presence.◪

Department and the U.S. District Court were wrestling with the final details of the actual AT&T break-up, the legislators were plodding along, presuming they would eventually have a role in it all.

It wasn't to be.

While contending with other forces, AT&T mounted a campaign to kill H.R. 5158 in April 1982 and eventually succeeded in doing just that. In August, the House subcommittee wrote Greene a letter saying it would not pursue a legislative solution to the telecommunications imbroglio and outlined details of its findings.

The Dole bill pales against that backdrop. The best thing it has going for it is its limited scope. Dole's proposal to wrest ongoing control of the former Bell operating companies from Justice and Greene and turn it over to the FCC is not the same as planning the restructuring of the industry.

But the bill is opposed by telecommunications equipment vendors, long-distance carriers and strong lobbying groups such as the American Newspaper Publishers Association. The former BOCs, for their part, welcome relaxation of marketing constraints the FCC would probably grant, but are generally weary of federal control.

The Dole bill, at this point, probably has less than a 50% chance of ever becoming reality.

To be fair, even if the Dole bill doesn't pass, it may still have some effect. Although S. 898 and H.R. 5158 never saw the light of day, the bills probably influenced regulatory policy-making, particularly within the FCC.◪

IBM's Systems Network Architecture.

The IBM Intercontinental Services will be introduced in two stages. Initially, customers will be able to access applications such as TSO, MVS batch and Applications System running in the IBM computer center in the Netherlands. Service will be available from the U.S., Austria, Belgium, Denmark, Finland, France, West Germany, Israel, Italy, Japan, Norway, South Africa, Spain, Sweden, Switzerland and the UK.

In October the service will be expanded to provide communications between IBM's Professional Office Systems software and bulk data transfer.

IBM Intercontinental Information Services are slated to begin July 31.◪

DATA DELIVERY
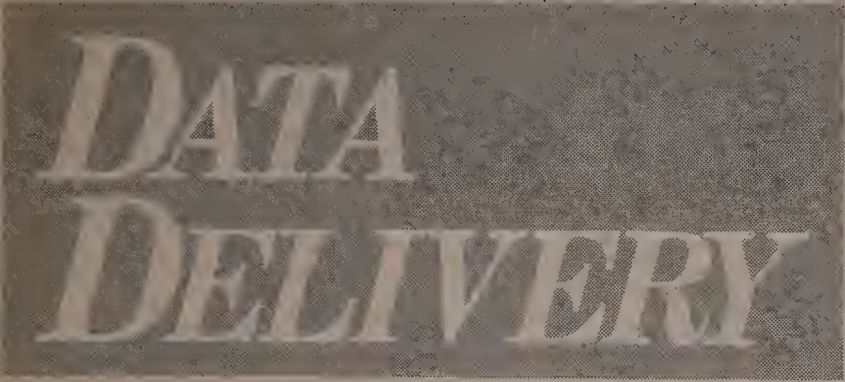
66 The recent IBM System/36 announcements represent another step toward true peer-to-peer networking. However, IBM has not yet put all the necessary pieces in place and still supplies basically a host-oriented network approach. A few years will pass before a user will be able to run a peer-to-peer network without a mainframe.

Stephen J. Randesi
vice-president
Communications Solutions, Inc.
San Jose, Calif.

▶ T-1 TECHNOLOGY

AT&T discusses new net control technique

Typically, network management and control tools evolve only after a technology has been in place for some time. Such is the case with T-1 services. A new framing technique, Extended Super Framing (ESF), promises to supply enhanced T-1 network control. Last month, AT&T began upgrading some of its central office facilities so they can support the new framing technique. Network World senior editor Paul Korzeniowski talked with Paul Barth, service manager for AT&T's Accunet 1.5, about ESF.

How does ESF differ from exist-ing framing techniques?
D4, the existing framing technique, essentially encloses 193 bits in a frame. Predetermined patterns of 12 bits are used to synchronize a line. ESF redefines the D4 framing pattern. ESF doubles the number of synchronization bits to 24 and adds a number of error-checking capabilities. Some of the bits are used for synchronization, others are used for cyclic redundancy check [CRC] and a data link.

In one second, a T-1 device will work with 8,000 of the 193-bit frames. ESF uses 2,000 bits for synchronization, 2,000 bits for CRC and 4,000 bits for a data link. CRC would allow us to examine a customer's bit stream and check the parity bits. We'll be able to look at the ones and zeros in a bit stream at the transmit side and on the receive side and identify any transmission errors. CRC enables us to run the various tests with actual customer data. The data link bits can be used to pass diagnostic information between various nodes.

Why is there movement toward this new framing technique?
Previously, the best way to per-

IBM INSIGHTS

Bye bye, small fry. IBM's relationship with Sytek, Inc. has apparently come to an end. "Telecom/Eye-Bee-Em," a newsletter published by International Resource Development, Inc. in Norwalk, Conn., reported that IBM has chosen not to renew an agreement for Sytek to supply IBM with its PC Network.

The report comes on the heels of what "Telecom/Eye-Bee-Em" called a faux pas by IBM 3270 PC Product Manager Peter Soutter, who recommended that users purchase the Token-Ring Network, rather than the PC Network. Soutter said that more research and development dollars were being spent on the Token-Ring than on the PC Network. IBM recently chopped its R&D dollars dramatically, so it appears the PC Network will get few, if any, future enhancements.

DATA DIALOGUE
JEFFERY HELD

Guarding the information flow

The public-switched telephone network has traditionally provided a straightforward and cost-effective way for remote terminals to access host computers. Until recently, security implications of this have been overlooked.

Publicized cases of illegal entry by hackers into government and commercial

Held is group manager of data communications, Network Strategies, Inc., Fairfax, Va.

data bases painted a nightmarish scenario for communications managers. On one hand, use of facilities such as leased private lines, which are less susceptible to unauthorized access, typically costs far more than dial-up access. On the other hand, a single instance of illegal access to sensitive information could be catastrophic. Fortunately, solutions for controlling access to hosts via dial-up terminals are emerging.

Comparison of dial-up security devices

Product	Access control technique	Password access	Data rates supported	Protocols supported	Audit trail provided
Digital Pathways, Inc. Defender II	Password / Call-back	Push-button Direct terminal or modem	Any compatible with dial modems	Independent of protocol	Logging of calls and attempts
TACT Technology Multisentry	Password / Call-back	Rotary dial / Push-button Voice	Any compatible with dial modems	Independent of protocol	Logging of calls and attempts
MicroFrame Data Lock & Key	Algorithm match-up	Data key or Magnetic card	Any	Any	Logging of calls and attempts
Optimum Electronics DL 1000	Password	Terminal	Up to 9.6 K bit/sec	Asynchronous	Logging of calls and attempts
Codercard	Algorithm match-up	Magnetic card	Asynchronous to 9.6 K bit/sec Synchronous to 100 K bit/sec	Asynchronous BSC HDLC	Logging of calls and attempts

SOURCE: NETWORK STRATEGIES, INC., FAIRFAX, VA.

▶ USER VIEW

How much is too much security?
Safety can stymie creativity.

BY NADINE WANDZILAK
Staff Writer

MOUNTAIN VIEW, Calif. — Even though too little security can leave a communications system vulnerable to tampering or destruction, a heavy security blanket can stifle creativity and productivity. A recent report, titled *Telecommunications Security*, from Input, Inc., a market research firm here, proposes a number of techniques that build secure telecommunications systems that are not prisons for users.

The report recommends that managers implement a combination of security measures based on the importance of data to be protected and the severity of a perceived threat. A security system should be modular so that procedures can be tailored to user needs.

An overzealous or overdesigned security system can create prisons of the mind, the report warns. Constraining programmers or communications technicians with excessive security restrictions can backfire because it may negate the very factor that makes their contributions cost-effective; that is, their creativity.

Every manager should ask two basic questions: How little — not how much — security do I really need, and how will security impact my ability to get my job done through the efforts of others? Judgment is the key, and available techniques should be used with discretion.

Hackers are not the primary threat to communications systems, the report states. Hackers usually break in for intellectual challenge, not for malicious reasons.

A security system is effective, the report con-

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Digital Data Service

High Capacity Digital Service

Net control from **page 13**

form maintenance for digital transmission was by loop-back tests. Loop-back tests sent a test signal, which was a mixture of ones and zeros, down a line and examined the bits when they came back. This was adequate means of testing for stress on a digital facility but did not supply some other needed capabilities.

Currently, telephone companies want to take into consideration idiosyncrasies in customer bit streams. For example, a customer's equipment may send more ones or more zeros than the test signal would send. The customer may encounter errors that would not show up in a test. Also, running a loop-back test may require several hours when the customer may not be able to use his T-1 facility. That may be unacceptable to some clients.

ESF enables us to analyze real customer data and do it in an in-service mode. The end result will be more availability of the digital facility. Standards groups, like the Consultative Committee on International Telephony and Telegraphy, support in-service, rather than out-of-service, diagnostics for digital facilities.

Does ESF supply any other type of testing capability?
For AT&T, we are able to look at a variety of error conditions, such as bursts and remote loop-back tests. A user may be able to run similar tests, depending on the capability of the customer service unit vendor. There are some enhanced network performance capabilities as well.

When will ESF be available?
We completed a field trial at a client network a few months ago. This month, we started to deploy ESF in live circuits. We plan to deploy ESF equipment this year and extensively throughout 1987. We are hoping to have all our T-1 digital circuits equipped by the end of next year. Equipment to support ESF at a central office is being manufactured. Some companies have started to manufacture CSU equipment that converts a D4 signal to an ESF signal on the customer's premises.

What do customers have to do?
Most customers will have equipment such as a multiplexer or a private branch exchange that works with D4 framing. To move to ESF, they have a couple of options. As part of our services, we take a D4 signal, bring it into our central office, convert it to ESF format and convert it back to D4 at the customer's end.

The customer would then have

ESF capability on the long-haul portion of the network. If a client decides to work with ESF at his site, he can enter a keyboard command that will tell our equipment to accept ESF data. The data will then be passed in ESF format from end to end.

How could a customer upgrade his equipment to support ESF?
The customer could use a CSU that would support conversion from D4 to ESF. This would require a minor change to a multiplexer, such as the swap-out of a circuit card.

> **"Telephone companies want to consider idiosyncrasies in customer bit streams."**

How can a client install a circuit that supports ESF?
We will request that the client release the circuit for a short period of time. Installing the equipment is not a very sophisticated process. Generally, we would request a two-hour release, and the work should take less time. Two hours is a maximum. We just want to ensure that all equipment functions properly before we give it back to the client. All the work is done at a central office.

What is ESF's status with the various standards-making bodies?
In the past, there had been some controversy within various standards groups. The controversy was over how the data link could best be used. We have supported the use of the data link for passing maintenance information.

Currently, that issue has been hashed out and all the vendors agree on the framing format and the capabilities for the various fields.

How long have ESF standards been in development?
Three years ago, AT&T recommended that ESF be used for in-service monitoring of DS-1 facilities. Time has been needed to have our recommendation accepted in the standards groups and for hardware and software to be developed to support that new format. ⊠

Security from **page 13**

cludes, "if the cost to a perpetrator is greater than potential gain." Managers and planners should aim for this point of equilibrium, the report recommends, and beware of oversecuring facilities.

The report describes security for both data processing and telecommunications departments, analyzes the breadth and limits of current technology and describes the impact of a national data encryption standard.

The report is available for $750 from Input, Inc., 1943 Landings Drive, Mountain View, Calif. 94043 (415) 960-3990. ⊠

Solutions from **page 13**

Several vendors are offering devices that restrict access to hosts via dial-up terminals. These devices are based on three security techniques. The most basic technique uses additional passwords.

In this case, a user would follow the steps normally required to access a host. However, a security device is placed between the host-site modem and the host's incoming dial-up trunk. This device intercepts the calls and requests a password or code. The code is usually entered by the user via a touch-tone keypad, or in some cases can be entered by a voice command. Unless the correct code is given, the security device would then terminate the call. With this approach, a hacker could not gain access to the host and would therefore be unable to use the system.

While the password approach provides an additional level of screening, it is not enough to protect the system from a determined hacker. Callback devices supply a higher level of security. A remote user calls a computer, and his call is answered by a security device. The user is usually asked to enter a password, and the connection is broken. The security device then calls back a predefined telephone number linked with the user's name and password.

Even if a password is stolen, the unauthorized user must also have access to the authorized terminal location to work with the host. Callback devices can help to prevent unauthorized access, but legitimate users can only access a system from one location. This restriction can be bothersome for mobile users.

A few vendors have begun to offer a more sophisticated technique that uses an algorithm to match a user with a terminal. The algorithm-matching technique requires a small encoding device that is carried by a user or attached to a terminal, usually through an RS-232 port. The encoding device contains a microprocessor that computes a code key based on a semirandom algorithm. A similar device, usually referred to as the verifier, is present at the host and contains the same algorithm.

When the user dials the host, the verifier intercepts the call, and asks the user to enter a coded sequence computed by the microprocessor. The verifier then computes its own sequence, using the same algorithm, and compares it to the sequence entered at the terminal. If the sequences match, the call is put through; otherwise access is denied.

The odds against correctly guessing the sequence are astronomical; one vendor said they are

40 billion to one. The algorithm-matching technique can be implemented in several ways.

One vendor, MicroFrame, provides a date key device that can be attached to or mounted inside a terminal. Another vendor, Codercard, Inc., provides a key card that is carried by the user.

Both systems allow users to access the system from any location and still maintain access security. The drawback to this approach is that it requires additional hardware, since each terminal or user must have access to an encoding device.

The chart on page 13 presents a sample of dial-up security devices using the techniques discussed above. Several vendors combine two or more of the security techniques to provide increased security or to make it easier to use their products.

There are several other features available. For instance, any security device must provide an audit trail. An audit trail is necessary to keep records for cost allocation or charge back and to trace any unauthorized use that does occur. Most systems also provide records of unsuccessful attempts, which may alert management to hackers' attempts to break into the system.

Another consideration is the number of dial-up lines supported. Some products are designed to support small installations based on personal computers and would not be cost-effective for a host system with 100 or more dial-in circuits. Systems that are designed for large host installations usually provide a rack-mounted configuration to cut down on both space requirements and cost. Other important selection criteria include sensitivity to protocols, support of high data rates, synchronous or asynchronous transmission and availability of integral modems.

> **"Any security device must provide an audit trail."**

Firms that make widespread use of dial-up computer access should consider an access control system. Although the cost of implementing such a system for a large host installation could be substantial, it is justifiable. System managers must weigh this cost against the risks of unauthorized access, loss of vital data and possible sabotage by hostile users. ⊠

Insights from **page 13**

Give a little, get a lot of grief. "Telecom/Eye-Bee-Em" also reported bloodletting at Rolm Corp. The folks from Armonk, N.Y., have moved full force into the Santa Clara, Calif., offices of Rolm and the result has been white collar flight. A number of Rolm vice-presidents have left the company. Analysts have said that Rolm has only

broken even financially since IBM bought the company. On a positive note, James M. Kasson, Rolm vice-president for corporate research, has been named an IBM fellow, the highest technical title the company awards. Kasson was credited with leading the development of the original CBX private branch exchange. Four other IBM employees also became fellows. ⊠

FACTORY COMMUNICATIONS

▶ ANALYSIS

CMC zeros in on burgeoning mart

Ethernet board manufacturer buys software firm to propel itself into MAP net market.

BY BOB WALLACE
Senior Writer

SANTA BARBARA, Calif. — Communications Machinery Corp. (CMC) is betting that its recent acquisition of Syros, Inc., a manufacturing automation software company based in Tempe, Ariz., will propel it into the fast-growing Manufacturing Automation Protocol network market.

CMC, a manufacturer of Ethernet local-area network boards, has said it will formally announce later this year its intention to deliver MAP and Technical and Office Protocol-compatible hardware and software. CMC would not say when the MAP/TOP products would be available. CMC is currently at work on integrating its hardware with Syros' manufacturing software, which complies with the middle and upper layers of the International Standards Orga-

nization's seven-layer Open Systems Interconnect (OSI) model. Both MAP and TOP are derivatives of emerging and established OSI standards. The CMC products reportedly will be designed to operate at 10M bit/sec.

Syros President Jay Eaglstun said the company's OSI-compatible software complies with the MAP Version 2.1 specification at several layers (see chart at right). The software has not been tested by Syros at the Industrial Technology Institute, an independent Ann Arbor, Mich.-based network and component testing facility.

CMC claims it intends to market full-blown MAP and TOP networks in the next year. But, with the exception of a CMC device that allows an Ethernet to run over broadband coaxial cable, neither company has extensive experience in producing

Syros Inc.'s OSI-compatible software vs. MAP specification Version 2.1

Both ☐ MAP only ☐

Layer 7 Application	ISO FTAM (DP) 8571 File Transfer Protocol Common Application Service Elements (Case) — ISO (DP) 8649
	Manufacturing Messaging Format Standard (MMFS)
6 Presentation	Null
5 Session	ISO Session (IS) 8327; Basic combined subset and session kernel, full-duplex
4 Transport	ISO Transport (IS) 8073 Class 4
3 Network	ISO Internet (DIS) 8473: Connectionless, subnetwork-dependent convergence protocol
2 Data Link	ISO Logical Link Control (DIS) 8802/2 (IEEE 802.2) Type 1, Class 1
1 Physical	ISO Token-passing bus (DIS) 8802/4 (IEEE 802.4): Token-passing bus, medium-access control

ISO = International Standards Organization (DIS) = ISO Draft International Standard
(DP) = ISO Draft Proposal (IS) = ISO International Standard

SOURCE: GENERAL MOTORS CORP. AND SYROS INC., TEMPE, ARIZ.

INCIDENTALS

The Autofact '86 conference and exposition, to be held Nov. 11 to 14 at Cobo Hall in Detroit, will focus on the strategic challenge of computer-integrated manufacturing (CIM). The show, entitled "Implementing CIM: A strategic challenge," will concentrate on technical and management issues essential to the industrial implementation of CIM.

A total of 20 technical sessions, 14 tutorials and three forums will feature over 120 CIM experts. Presentations will cover CIM topics such as management and planning, integration methodologies, flexible manufacturing systems, manufacturing control, artificial intelligence and computer-aided engineering.

For a copy of the Autofact '86 program announcement, contact the Society of Manufacturing Engineers at (313) 271-0777.

⚙

Able Technical Products Corp. of Danbury, Conn., is offering a software program that is designed to introduce personnel to Manufacturing Resource Planning (MRP) II without attending seminars. The single-disk tutorial, dubbed First Step MRP II, comes with a software operation manual and costs $49.

FACTORY FACTS

BOB WALLACE

Tight lips must loosen on MAP, CIM

If the implementation programs for Computer-Integrated Manufacturing and the Manufacturing Automation Protocol are to succeed, companies involved must share their experiences, good and bad, with other users.

Although General Motors Corp., the company that began the industry's largest user revolution, has preached the MAP gospel for several years, the automaker is tight-lipped about its successes and failures with MAP implementations. The company divulged information on limited aspects of its Truck and Bus MAP project at the last users group meeting, but refused to allow the information to be disseminated to members of the users group as part of the conference proceedings (see "GM details MAP project," *Network World,* May 26).

Large and medium-sized corporations have adopted a no-comment approach to discussing efforts to upgrade their factories with the media and interested

users. These companies claim divulging information on their forays would eliminate a competitive edge they hold over their competitors. Although this is understandable, it serves to stifle efforts of companies that are not their competitors to implement the latest factory communications technologies.

Ironically, vendors often supply far more information about users' factory progress than do the users themselves. Factory equipment vendors, in an effort to push their products to cautious users, often shed light on some of their users' factory networking and automation projects. This valuable information is not enough to explain adequately what users are doing to improve their manufacturing operations. Input from users is invaluable but also extremely difficult to extract.

Companies installing or planning to install advanced factory networks often do not want to discuss their travails with oth-

ers until the project has been completed to their satisfaction. Other manufacturers have chosen not to divulge information until a system in a specific plant is operational and performing properly.

These companies do not want the outside world to see how factory automation and communications equipment is installed. They do not want anyone to learn of difficulties the company encountered in its efforts to modernize its manufacturing facilities. By adopting this approach, users are slowing the process of change in the manufacturing industry.

GM must lead the MAP users group by example. The company must share its experiences with members and with other manufacturers considering implementing MAP networks. By that process, users can learn from GM's hands-on work with planning, designing, implementing and operating MAP communications networks.

► ADVANCED COMPUTER COMMUNICATIONS

Firm comes through on MAP compatibility promise

Plug-in board links DEC VAXs to MAP networks.

BY BOB WALLACE
Senior Writer

SANTA BARBARA, Calif. — Advanced Computer Communications Co. (ACC) recently made good on its promise to offer Manufacturing Automation Protocol-compatible products when it announced a plug-in board that will reportedly allow Digital Equipment Corp.'s VAX computers to connect to MAP networks.

ACC inked a pact with Retix, a fledgling Santa Monica, Calif.-based MAP software producer that provided ACC with software com-

patible with MAP Version 2.1 at the recent MAP/TOP users group meeting in Seattle ("Incidentals," *Network World*, May 26). MAPVAX is scheduled to be beta-tested later this quarter.

MAPVAX will allow DEC VAXs that use either Berkeley Unix or Ultrix 32 operating systems to connect to the popular token-passing bus factory floor communications networks. MAPVAX consists of three components — software placed in the VAX computer, a front-end communications processor circuit board and a broadband board that must be inserted in a ra-

dio frequency modem. The modem board serves as the device that physically links the VAX to the MAP net.

The modem board's software is compatible with Layer 1 of the seven-layer factory communications specification (see chart on previous page).

The communications processor board's software is compatible with Layers 2, 3 and 4. The VAX-resident software complies with Layers 5, 6 and 7 of MAP 2.1.

Advanced Computer Communications Co., 720 Santa Barbara St., Santa Barbara, Calif. 93101. ◪

► HEWLETT-PACKARD

CAD pack unveiled

Hewlett-Packard Co. recently unveiled a computer-aided software engineering (Case) and personal computer-based computer-aided design (CAD) software package.

HP Teamwork/Structured Analysis reportedly provides computer-aided support for the specification phase of software development. Use of the software reduces the cost of the entire software development process.

The new software runs on the HP 9000 Series 300 technical workstations. It enables a project team to capture design requirements quickly, organize them into models and evaluate and maintain them for large and small system designs.

HP Teamwork/Structured Analysis is part of HP Designcenter, an integrated design environment used for electronic, mechanical and software engineering. HP Designcenter consists of systems, software and support in CAD and computer-aided manufacturing.

The Draftpro Plotter, an eight-pen unit, was reportedly designed by the company for personal computer-based CAD applications. The device provides plotter reliability for designers in small architectural and engineering firms, small departments of large companies and educational institutions.

The plotter is said to be compatible with such personal computers as the IBM Personal Computer, the HP Vectra PC and Apple Computer, Inc.'s Macintosh. An RS-232-C interface comes with the plotter.

HP Teamwork/Structured Analysis is available immediately and costs $8,900. The HP Draftpro Plotter is also currently available and costs $5,400.

Hewlett-Packard Co., 1820 Embarcadero Road, Palo Alto, Calif. 94303. ◪

MAP/TOP MEETINGS

The following is a partial list of Manufacturing Automation Protocol, Technical and Office Protocol and MAP/TOP-related committee meetings, conferences and workshops.

July 15, 1986
MAP Technical Review Committee
Speaker: Tom Brushaber, committee chair
Site: GM Technical Center
Location: Warren, Mich.
Sponsor: MAP Task Force
Contact: Tom Brushaber, GM, (313) 456-2234

July 16, 1986
MAP/TOP Testing Committee
Speaker: Mark Adler, committee chair
Site: GM Technical Center
Location: Warren, Mich.
Sponsor: MAP Task Force
Contact: Mark Adler, GM, (313) 492-1582

July 16, 1986
Network Layer
Speaker: Karl Schohl, committee chair
Site: GM Technical Center

Location: Warren, Mich.
Sponsor: MAP Task Force
Contact: Karl Schohl, GM, (313) 575-1585

July 17, 1986
MAP Task Force
Speaker: Steve Dillon, committee chair
Site: GM Technical Center
Location: Warren, Mich.
Contact: Steve Dillon, GM, (313) 575-2843

July 17, 1986
NBS-OSI Implementors Workshop
Site: Marriott Hotel
Location: Gaithersburg, Md.
Sponsor: National Bureau of Standards
Contact: NBS, (301) 921-1000

Aug. 6, 1986
TOP Physical Layer Subcommittee
Speaker: Arthur Miller, committee chair
Location: Seattle
Sponsor: TOP Technical and Test Review Committee
Contact: Victor Lukasik, Boeing Computer Services Co., (206) 763-5457

► SOFTWARE

DEC, Auto-trol ink pact

MARLBORO, Mass. — Digital Equipment Corp. recently inked an agreement with Auto-trol Technology Corp. that will allow DEC to market Auto-trol's design and production software for the manufacturing, architecture, engineering and construction industries.

DEC will sell Auto-trol's Series 5000 Advanced Graphics Software and Series 7000 software, both of which will run on DEC's VAX family of computers.

Auto-trol's products were used in the minifactory demonstration at the recent Advanced Manufac-

turing Systems '86 show held in Chicago.

Auto-trol's Advanced Graphics Software is designed to help manufacturing firms automate an entire product cycle.

The Series 5000 software is designed to help companies design, document and maintain both commercial and industrial facilities.

Auto-trol will release the Series 5000 software for use on DEC's color VAXstation II/GPX in September. The company plans to release the Series 7000 for use on the workstation this winter. ◪

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broadband, token-passing bus networks. The MAP factory communications specification mandates the use of IEEE 802.4 token bus nets.

If CMC is successful, it will probably lock horns with established market force Industrial Networking, Inc. (INI) in the next year. INI markets MAP-compatible networks and individual components to both users and OEMs. CMC also plans to peddle its manufacturing systems wares to users and OEMs as well as to systems integrators.

Systems integrators assemble a turnkey system from off-the-shelf products produced by other vendors. These turnkey systems are sold directly to users.

To survive among vendors like INI, CMC will be forced to bring quality products to market quickly. Russ Sharer, CMC marketing vice-president, claimed the company plans to offer network hardware and software that will be packaged by systems integrators who would tailor turnkey systems to individual user applications. This plan would cut operating expenses by eliminating the need for CMC to retain large installation and maintenance staffs.

Currently, all major factory network and net component vendors rely on systems integrators to provide users with such application-specific factory systems. Sharer said CMC is determining which future products will be sold to OEMs and systems integrators and which will be sold directly to factory floor network users.

CMC seems to have learned a valuable lesson from the experiences of INI. The Santa Clara, Calif.-based MAP net producer initially marketed MAP/One, a complete turnkey network system, directly to users. But its prime competitor, Concord Data Systems, Inc., opted to sign a series of large OEM agreements for its network components with companies such as Digital Equipment Corp., Honeywell, Inc. and Fairchild Data Corp. Concord Data's OEM strategy helped the company significantly increase sales of its network components. INI finally unbundled its MAP/One system early this spring, at which time it inked an OEM pact with Intel Corp.

"We currently sell our Ethernet equipment to systems integrators who add applications software to complete the package," Sharer explained. "We hope to offer the same type of package to users building a MAP network. CMC's future MAP nets will be compatible with the most up-to-date MAP specification," he said.

"It is our intent to stay abreast of MAP technology. If we can produce a factory networking package that complies with MAP [Version] 2.1, we will. Otherwise, we will produce a system that conforms with [MAP Version] 3.0." The third version of the factory communications specification is due out early next year.

Details of the Syros acquisition were not divulged. Sharer also declined to discuss whether CMC plans any future acquisitions. ◪

COMMUNICATIONS MANAGER

Voice store-and-forward

According to a report issued by Forrester Research, Inc., voice store-and-forward was the technology that the greatest number of survey respondents said they would implement by 1988. Laptop computers ranked second.

▶ PURCHASING STRATEGIES

Site visits offer users up-close view

BY MARGIE SEMILOF
Senior Writer

Communications managers generally rave about site visits to other user installations. Such visits are often the only method of observing a product in a real user environment without the vendor hype.

At the very least, most managers will call other users for advice before purchasing a product. Contacting users via phone provides the basic assurance that others are trying the same network implementation. But the purchase of big ticket items, such as local-area networks or private branch exchanges, demands that users plan a trip to see the pro-

spective product in action.

Users are referred to other customers by the manufacturer, who typically screens sites to avoid sending one user to another customer in the same line of business. This effort is necessary because more customers are beginning to view their networks as a strategic tool that gives their companies a competitive edge.

Cal Ohidy, manager of telecommunications services at Trumbull, Conn.-based Chesebrough-Pond's, Inc., recommended that users insist on seeing a mix of the vendor's customers rather than the vendor's favorite product showplaces. It is unlikely that any vendor would knowingly give a potential customer

Projected growth of LAN market in U.S.

Amounts in millions
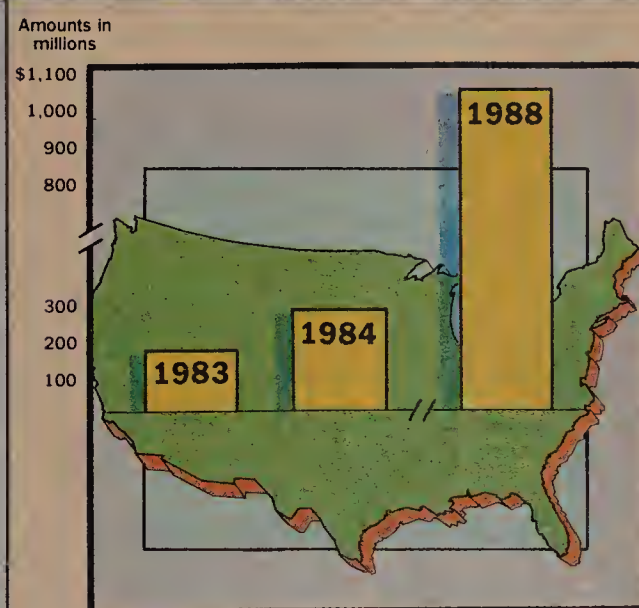
U.S. LAN market projections are for the business to grow from $244 million in 1984 to $1.031 billion in 1988, a 46.5% compounded annual growth rate in the 4-year period.

SOURCE: DATAQUEST, INC., SAN JOSE, CALIF.

DIALOGUE

What is important in choosing a communications vendor?

❝ First, financial stability. I'm also concerned about maintenance capability and whether there are local people to assist us or a national hot line. And a vendor's track record. We like to deal with vendors who have been around for at least three to five years.

David Johnson
vice-president
corporate systems
Family Life Insurance Co.
Seattle

❝ A track record, which implies that a product is in use and that it has received good reviews or is being accepted in the industry. We also check into a company's reputation and study the maintenance agreements they offer.

Jeff Cochran
director
systems engineering and
telecommunications
U.S. Patent and Trademark Office
Arlington, Va.

❝ Cost and cost-effectiveness, service and support. And, looking a few years into the future, complementary products.

We look at a vendor's financial stability, too.

Jack McGrath
assistant vice-president
telecommunications
Conrail
Philadelphia

GUIDELINES
MARGIE SEMILOF

The options vary for managing multisite nets

Although users are quickly adapting to the changes brought about by divestiture, there are still many companies wrestling with the decision of whether to adopt a centralized or decentralized management philosophy for their multisite operations.

The businesses that have yet to make this all-important management decision are typically the ones that still keep their companies' network responsibility within the fracted remains of the Bell System.

In some cases, these communications managers are beginning to realize the high price they may be paying for attempting to keep some semblance of a single-vendor environment.

There is no right or wrong way to organize communications management. The division of network responsibility largely depends on the type of business and the physical setup of a company.

One reason companies adopt a centralized management system is to maintain as much equipment compatibility as possible.

The central site provides the

corporate communications manager — as well as the corporation — with one point of focus. Equipment can be purchased without many different managers making a variety of decisions.

Also, maintenance contract costs may be lower, and equipment problems can be diagnosed and resolved from one location.

In addition, managers claim that costs are easier to control when buying decisions emanate from one site.

Decentralize to reduce costs

A decentralized environment may also be conducive to controlling or lowering network expenditures.

Remote site managers with control over their own networks can make decisions based on what is best for their locations. They may be able to shop around for better local pricing from smaller carriers.

One drawback to decentralized communications systems is that they require more personnel. Also, the corporation may have several locations paying numerous bills from different telephone companies.

ASSOCIATIONS

CCIA briefing on Federal Telecommunications Policy Act

The Computer and Communications Industry Association (CCIA) will hold an educational briefing on July 17 at the Hyatt Regency Washington. The meeting will cover the recent passage of the Federal Telecommunications Policy Act of 1986.

Sen. Robert Dole's (R-Kan.) counsel, Pete Velde, and his administrative assistant, Michael Pettite, will address the forum. Velde and Pettite are Dole's political advisors and drafters of the telecommunications policy legislation (S. 2565).

Also speaking will be telecommunications policy officials, including Albert Halprin, chief of the Federal Communications Commission's Common Carrier Bureau, and representatives of various Bell operating companies.

For additional information on the briefing, contact Glenn Davidson, CCIA's director of public affairs, at (703) 524-1360.

CMA's 1986 keynote speakers announced

Hollis Sobers, president of the Communications Managers Association (CMA), announced three keynote speakers for the group's 1986 annual conference.

Dennis Paboojian, president of Rolm Corp., Maria Sbrilli, vice-president of Smith Barney, Upham Harris & Co., and Harry Newton, president of Telecom Library, Inc., will address the conference, to be held Oct. 8, 9, and 10 at the Long Island Marriott Hotel in New York.

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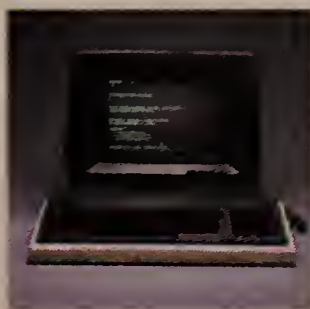
And why a whole system, rather than stand-alone pieces, is what keeps your network up and running.

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It can have a calming effect on your workplace.

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The right choice.

Site visits from **page 19**
the name of a disgruntled user, but Ohidy said even the vendor's best customers can provide information about product glitches if they exist.

"The vendor cannot control what the user will say," he said. "I have found most manufacturers are honest when they provide a list of other users. We have visited satisfied customers and customers that are not as pleased."

Some users claim it is difficult to keep a site visit objective and tone down the vendor's sales pitch because a vendor representative usually tags along on the tour. Managers should seek out the other customers' technical staff to discuss the product's strengths and shortcomings.

Neil Hennessy, manager of communications technology at Readers Digest Association, Inc., suggested asking the vendor to explain the criteria for choosing particular demonstration sites.

He also advises trying to visit other user sites, minus the presence of the manufacturer's representative.

"That is pretty tough to do," he admitted. "But you can still have your data communications manager meet with their data communications manager independently."

Managers should prepare a list of specific inquiries prior to arriving at the host site. These questions should request information on end-user satisfaction in the following areas: ease of use and installation,

maintenance, ease of software changes and responsibility for installation.

Product-specific materials useful

Product-specific research materials are provided by consulting houses, but they are expensive. However, they may be useful because they contain detailed information about competing products.

Running a demonstration in your own facility or on the vendor premises is sometimes necessary when a product is new and there are few available users.

In the case of an unproven product, managers should insist on talking to observers of first and second beta test sites for feedback on equipment performance. ◪

NEW PRODUCTS AND SERVICES

► TELEPHONY

Messaging system out

ITS tool boasts telephone-terminal combo.
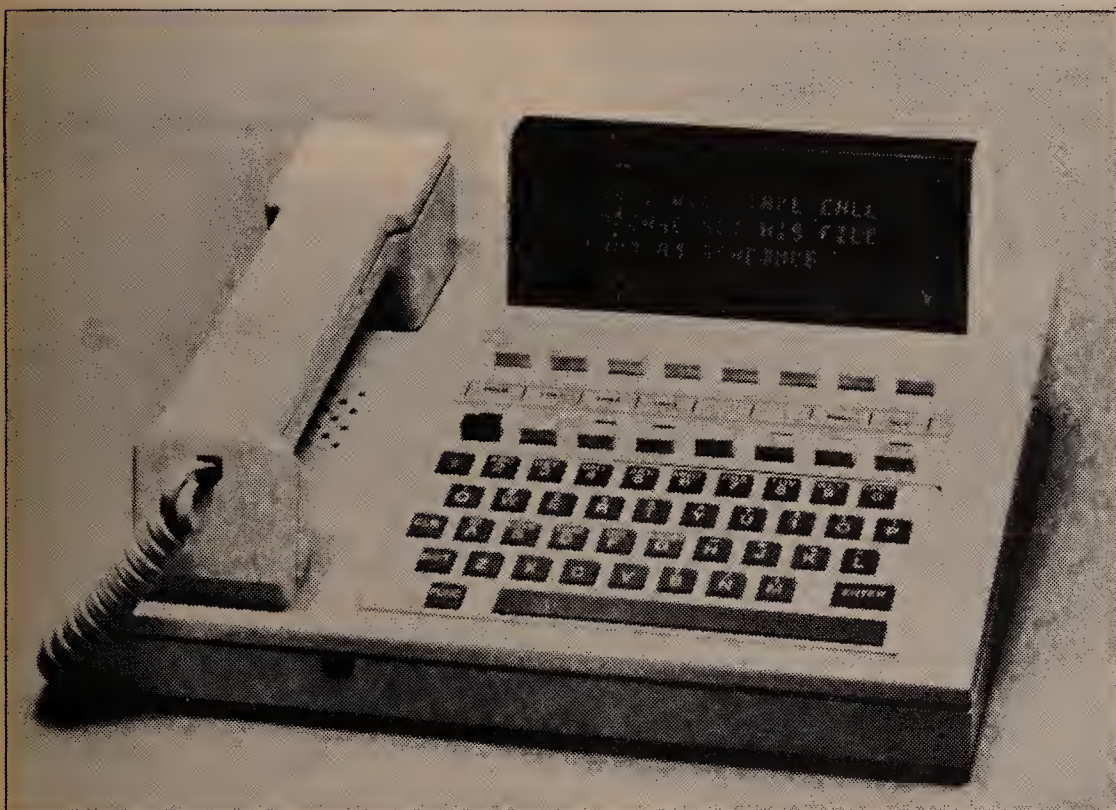
BY JIM BROWN
New Products Editor

SUNNYVALE, Calif. — Integrated Telecomputing Systems, Inc. (ITS) last week introduced the Advanced Messaging System (AMS), which boasts a telephone set with a built-in Ascii terminal and keyboard.

The Message Phone provides text messaging or simultaneous voice and data communications with other Message Phones. It can also be connected to an IBM Personal Computer to create what the company calls a PC Message Attendant Station, which supports use of a personal computer keyboard in place of the Message Phone's built-in keyboard. Another AMS feature, called the Message Reader, includes a personal computer voice synthesizer ex-

pansion board that converts Ascii text messages stored in the Message Phone's memory into a computer-generated voice.

The system works with any Centrex switch and looks like a standard 2500 telephone set to most private branch exchanges. The firm is touting the product as a way to provide Centrex users with PBX-like features.

"This is the type of system that will help enhance Centrex capabilities," said David Kalman, ITS' vice-president for sales and marketing.

The Message Phone supports such PBX-like features as a speed-calling directory of 200 numbers, each of which can be up to 32 digits long, camp-on, call transfer, conference call, call forwarding and call pickup functions.

The Message Phone requires two sets of twisted-pair wire, one set connecting to the telephone side, the other connecting to the terminal side. The terminal is based on a National Semiconductor Corp. 8015 microprocessor with 32K bytes of memory. It is equipped with a serial port and a

► LOCAL-AREA NETS

Repeaters link Ethernet segments

BY JIM BROWN
New Products Editor

BROOKFIELD CENTER, Conn. — Photonics, Inc. introduced a pair of repeaters that link Ethernet local-area network segments located 165 feet or more apart.

The RL6000 repeaters are designed to let users create networks in campus and high-rise building environments. The devices connect up to five different 1,650-foot-long Ethernet coaxial cable segments to create an Ethernet network up to 1¾ miles long. A local version links segments located less than 330 feet apart, and a remote fiber-optic-based version links segments located up to 3,300 feet apart.

The IEEE 802.3- and Ethernet Version 2.0-compatible repeaters support the first two layers of the International Standards Organization's Open System Interconnect model, the physical and data link layers.

James Walyus, president of Photonics, said the devices regenerate and retime Ethernet electrical signals, which reportedly start faltering after traveling the 165-foot-long transceiver-to-transceiver link normally used to join Ethernet segments.

The RL6000-L local model links

Ethernet segments by joining two Ethernet transceiver cables that are up to 165 feet in length.

Transceivers connect to the Ethernet carrying coaxial cable and transmit the signal over a transceiver cable made of three sets of twisted-pair wire to either an Ethernet connected device or to another transceiver connecting to a different Ethernet coaxial segment.
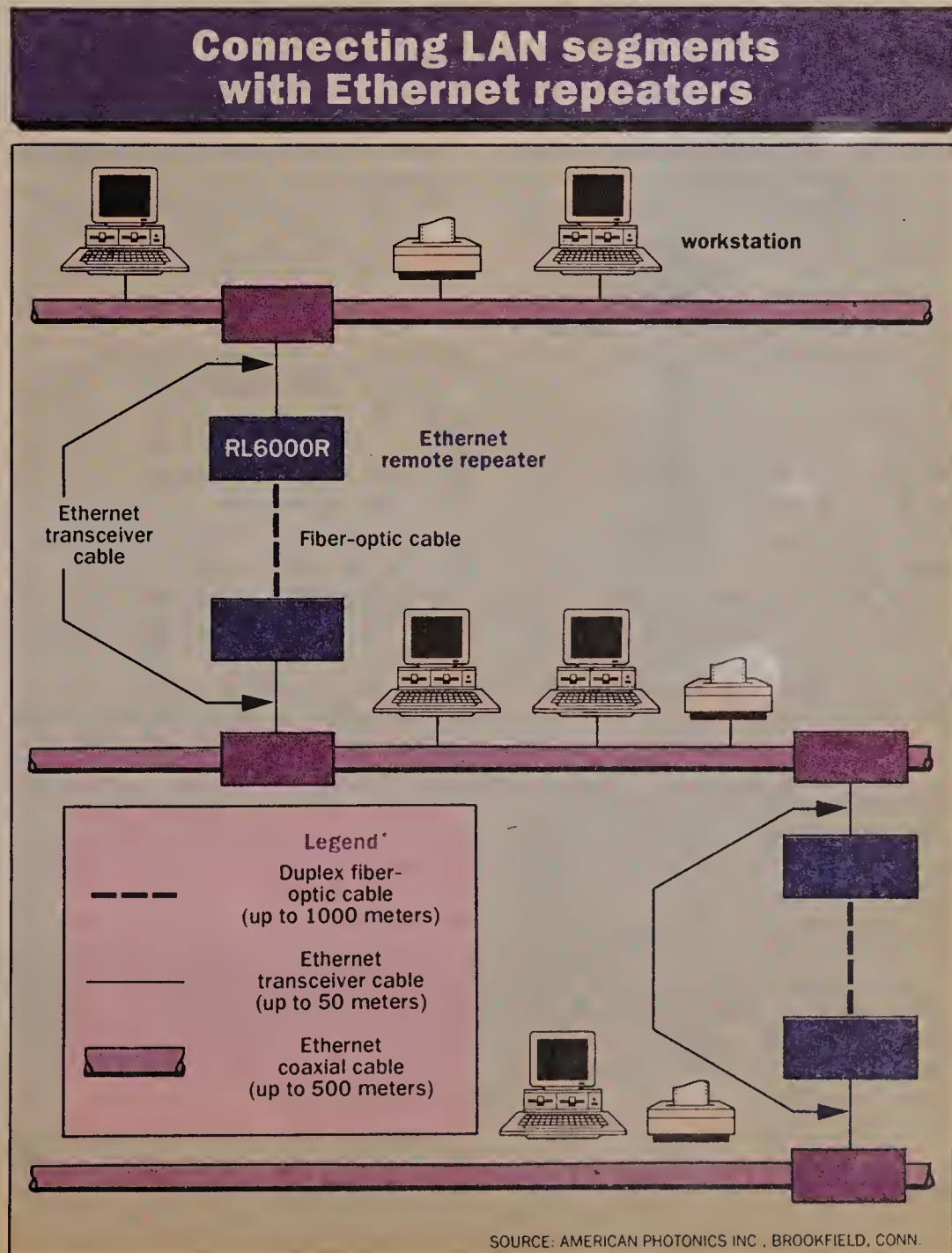
The RL6000-R remote repeater links Ethernet segments by converting into light waves the electrical signal received from an Ethernet transceiver cable.

The device automatically adjusts to transmit the light wave over fiber-optic cable diameters of 50, 62.5, 85 or 100 microns. The light wave is converted back to electrical signals at the other end and is transmitted over a second transceiver cable no more than 165 feet long.

Designed for heavy use

"We designed the repeaters so they will work in heavy use environments," Welyus said. The devices are designed, he said, to accept packet lengths and packet spacing that differs from Ethernet standards because some heavily used Ethernet networks were

Connecting LAN segments with Ethernet repeaters

workstation

RL6000R — Ethernet remote repeater

Ethernet transceiver cable

Fiber-optic cable

Legend
- - - Duplex fiber-optic cable (up to 1000 meters)
——— Ethernet transceiver cable (up to 50 meters)
▭ Ethernet coaxial cable (up to 500 meters)

SOURCE: AMERICAN PHOTONICS INC., BROOKFIELD, CONN.

▶ NETWORK SYSTEMS CORP.

Software lets users monitor file transfers

Graphic display pinpoints net problems.

MINNEAPOLIS — Network Systems Corp. released software that monitors communications over its 50M bit/sec Hyperchannel network for file transfers between mainframes and minicomputers and over its 10M bit/sec Hyperbus network for file transfers between terminals.

The package, called H958 Network Monitor, runs on a Digital Equipment Corp. MicroVAX II computer using a Tektronix, Inc. 4105A color display. The Network Monitor runs under the firm's Netex network operating system.

Robert Burns, the firm's vice-president for network system planning, said the package can be programmed to send a loop-back signal to all points on the network at prescribed times.

The package measures the time it takes to receive the message back and compares that information against a predefined threshold to determine whether there was a delay.

The package displays a map of the network on the color terminal. As signals are received by the package, network points change color to report whether links are operational, partially operational, not operational, not tested or off-line.

An operational message indicates the link operated satisfactorily. "Partially operational," Burns said, "indicates a threshold for error retransmissions has been exceeded, and the link should be examined."

A not-operational message indicates the loop-back signal did not return to the MicroVAX II, while the not-tested message indicates that the network point is not currently under test. The off-line message indicates the unit under test has been taken off the network.

This fall, the firm is expected to release a network administration package allowing an administrator to configure networks and profile network nodes for operational speed and transmission methods.

It will also allow the administrator to configure security access methods and record transactions for billing purposes and network usage reports.

Burns said the firm plans to release an administration package for the Hyperchannel network and one for the Hyperbus network. Both packages will run on the MicroVAX II in conjunction with the Network Monitor and are expected to be priced above the $7,000 list price for the Network Monitor. ⊿

built-in 300-baud modem.

With the Message Phone, a receptionist can forward a text message to notify someone of a call waiting.

That person sees the message displayed on a three-line display screen and strikes a function key to instruct the receptionist to put the call through or to take a message.

Messages are generated from the keyboard or by striking one of up to 22 programmable keys that store phrases frequently used in messages. The message is time-stamped into a user's Message Phone memory.

A beep and a visual message tell users to check their scrollable message file, and a function key supports automatic dialing of a telephone number displayed in a message.

With the PC Message Attendant Station, a receptionist picks up incoming phone calls and can toggle out of a personal computer application in order to use the personal computer keyboard to generate messages.

The Message Phone connects to the personal computer with an RS-232 cable and communications software.

With the Message Reader, users enter numerical commands from a remote push-button telephone. The commands send messages stored in the Message Phone's memory to the voice synthesizer board, which converts the Ascii text into a voice transmitted over the telephone line.

The Message Phone's built-in 300-baud modem allows users to access on-line personal computer services such as Western Union Telegraph Co.'s Easylink and similar services.

The modem will also establish text or data communications with other Message Phones.

"What we're finding is [that] people have a lot of data services they dial into. They need an inexpensive terminal to get on, do some work and get off. The Message Phone serves the purpose because it's got an Ascii terminal and a modem," Kalman said.

Three-line Message Phone units are priced at $800 each, while single-line versions are priced at $700 each. Adding a PC Message Attendant Station will cost about $150, and the Message Reader option costs about $4,000. ⊿

found to be exceeding those standards.

Repeaters as traffic cops

"Some repeaters act as traffic cops, and because they are designed to meet the standard right to the tee, they let nothing but the standard packet through," Walyus explained.

"We modified our product so it didn't turn out to be the traffic cop. If some people had a system that worked, we didn't want to be the thing that didn't make it work," he added.

A local version lists for $1,450, and the remote version lists for $2,150. ⊿

PRODUCTS & SERVICES

ISDN test set

Dynatech Integrated Services Digital Products (ISDP), an arm of **Dynatech Corp.**, announced an Integrated Services Digital Network test set that generates the physical characteristics of the ISDN basic rate interface.

Delta Probe 1 is said to be able to generate 48-bit frame patterns in order to check bidirectionally the interface at the CCITT's "S" reference point. The company claims to be the first to offer an ISDN interfacing and testing product that includes terminal adapters, primary rate converters and other test equipment.

The product costs $495.

Dynatech Integrated Services Digital Products, 5419 D Backlick Road, Springfield, Va. 22151 (703) 354-2900.

Eight-port active local net hub

Standard Microsystems Corp. has introduced a compact eight-port active hub with a footprint half the size of its original eight-port active hub. It can be used to join both Arcnet-PC200 serial coaxial topology and Arcnet-PC100 free-form tree coaxial topology. The maximum distance between an active hub and a network node is 2,000 feet.

The **Active Hub-01** provides proper termination for the RG-62/

U cable and signal regeneration to maintain data integrity over 2,000 feet.

The Active Hub-01 is $885 each in quantities of one to 99.

Standard Microsystems Corp., 35 Marcus Blvd., Hauppauge, N.Y. 11788 (516) 273-3100.

Macintosh software upgrade

Hayes Microcomputer Products, Inc. introduced an upgraded version of its Apple Computer, Inc. Macintosh communications software that provides a programmable soft key as well as automatic start-up and file name features.

The programmable key feature provides faster execution of the Macintosh Autopilot sequence by assigning a single-character identifier to it. When an identifier and an option key are pressed, the sequence is executed.

The automatic start-up sequence enables users to access Smartcom II, dial, log on to another system, execute desired Autopilot sequences and log off by double clicking the Macintosh mouse.

The enhanced program allows the receiver to name incoming files automatically using the name assigned to the file by the sender or to rename the files.

The software, which provides all the features in the program's original release, supports data transmis-

sion speeds up to 19.2K bit/sec.

Smartcom II V2.2 runs on all versions of the Macintosh, including the newly released Macintosh Plus. The system costs $149.

Hayes Microcomputer Products, Inc., P.O. Box 105203, Atlanta, Ga. 30348 (800) 622-8878.

Fiber-optic multiplexer

Fibermux Corp. announced a new full-duplex fiber-optic multiplexer that supports up to 96 full-duplex channels of asynchronous data at speeds up to 19.2K bit/sec or synchronous data at speeds up to 9.6K bit/sec.

FX 9601 operates over fiber-optic lines at speeds from 50M bit/sec to 100M bit/sec.

The device provides six 50-pin telephone company connectors, which may be routed to punch-down blocks or to modular hardware for distribution. Controls or clocks may be transmitted as well. The product has built-in self-test and loop-back features.

A second model of the product, the **FX9601/48**, supports 48 full-duplex channels at speeds up to twice as fast as those of the 96-channel version.

The 96-channel multiplexer is priced at about $4,000.

Fibermux Corp., 21630 Lassen St., Chatsworth, Calif. 91311 (818) 709-3782.

Data line monitors

Spectron, a division of **Northern Telecom, Inc.**, introduced the latest in its line of data line monitors and protocol analyzers.

The **Datascope 2000** is a microprocessor-based portable unit. It operates at speeds up to 19.2K bit/sec in full-duplex mode and features an optional built-in modem supporting speeds from 300 bit/sec to 1,200 bit/sec. Preprogrammed tests can be stored in the unit, or it can be programmed remotely through another Datascope 2000 or Ascii terminal.

The product's automatic protocol decoding feature supports concurrent testing of send and receive signals for asynchronous, bisynchronous and synchronous data link control; high-level data link control; advanced data communications control procedure; X.25, X.75 and IBM's Systems Network Architecture protocols.

The unit can hold 192K bytes of information in an internal buffer and can store up to 800K bytes on a 3.5-inch disk. Printer support is rendered through an RS-232 serial port and a dedicated parallel printer port.

The Datascope 2000 is priced at $3,650.

Spectron Division, Northern Telecom, Inc., 8000 Lincoln Drive East, Marlton, N.J. 08053 (609) 596-2500.

NETWORK WORLD
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Signature _____

Title _____ Date _____

Business Phone (_____) _____

PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.

1 My primary areas of activity. Circle ONE only.
I am involved in evaluating communications (data, voice and /or image) products and services:
1. for *use within my own* company/organization
2. for *resale* to other companies/organizations
3. Both

1a For communications, my primary responsibility is: Circle ONE only.
1. Data Communications
2. Voice Communications
3. Both

2 Circle only the ONE title classification which most applies to you.

Company Management
11. Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CIO, VP, Dir. Head of Finance, Admin. Procurement

Communications Management

Data Communications
21. Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
22. Supervisory/Staff
Supervisor, Head : Networking, Design, Analysis, Engineering, R&D, Applications, Services

Telecommunications
31. Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks. Engineering, Design, R&D, Application Development
32. Supervisory/Staff
Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services

Factory Communications
41. Management
42. Supervisory/Staff

MIS/Data Processing
51. Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
52. Supervisory/Staff: Supervisor, Head of System Design, Analysis, Applications

Others
75. Consultant
80. Educator
85. Financial Analyst
90. Marketing/Sales
95. Other _____

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3 **Job Function**
Which one of the following best describes your functional involvement with communications (data, voice, and/or video) products? Circle ONE only.

Corporate
1. Business Management, Planning and/or Development

Communications System/Network
2. Management, Planning and/or Development
3. Implementation and/or Operation
4. Other _____

4 Which one of the following best describes the primary business activity of your organization at this location? Circle ONE only.

Consultants
11. DP/Communications Consulting Services
12. Consulting Services (except DP/Communications)

End Users
13. Manufacturer (other than computer/communications)
22. Finance/Banking/Insurance/Real Estate
23. Education
24. Medicine/Law
25. Wholesale/Retail Trade
26. Public Utility/Transportation
27. Mining/Construction/Petroleum Refining/ Agriculture/Forestry
28. Business Services (excluding DP/Communications)
29. Government: Federal
30. Government: State/Local

Vendors
41. Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, Intern'l Records Carriers
42. Interconnect
43. Manufacturer Computer/Communications Equipment
44. Value Added Reseller (VAR), Systems House, Systems Integrator
45. Distributor
46. DP/Communications Services (excluding consulting)
95. Other _____

5 In which ways do you typically become involved in acquiring communications products (data, voice, and/or video) and services? Circle ALL that apply.
1. Recommend/Specify
2. Identify/Evaluate Potential Vendors
3. Approve the Acquisition
4. None of the Above

6 Check ALL that apply in columns A and B.
A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
B. These products and services are presently in use at this location:

A	B	Product/Services	A	B	Product/Services
		Computers			*Transmission/Network Services Equipment*
01. ☐	☐	Micros	18. ☐	☐	Microwave
02. ☐	☐	Minis	19. ☐	☐	Satellite Earth Stations
03. ☐	☐	Mainframes	20. ☐	☐	Local Area Networks
		Data Communications	21. ☐	☐	Wide Area Networks
04. ☐	☐	Communications Processors	22. ☐	☐	Packet Switching Equipment
05. ☐	☐	Comm./Networks Software	23. ☐	☐	Fiber Optic Equipment
06. ☐	☐	Digital Switching Equipment			
07. ☐	☐	Facsimile			*Communications Services*
08. ☐	☐	Modems	24. ☐	☐	Packet Switching Services
09. ☐	☐	Multiplexers	25. ☐	☐	Cellular Mobile Radio Services
10. ☐	☐	Protocol Converters	26. ☐	☐	Electronic Mail
11. ☐	☐	Network Mgmt. & Control	27. ☐	☐	Enhanced Services
12. ☐	☐	Test Equipment	28. ☐	☐	Centrex
13. ☐	☐	3270 Controllers			
		Telecommunications			
14. ☐	☐	PBXs			
15. ☐	☐	Key Systems			
16. ☐	☐	Central Office Equipment			
17. ☐	☐	Integrated Voice/Data Terminals			

7 Estimated value of communications systems, equipment and services:
A. which you helped specify, recommend or approve in *last* 12 months? Check only ONE in column A.
B. which you plan to specify, recommend or approve in *next* 12 months? Check only ONE in column B.

A	B		A	B	
1. ☐	☐	Over 10 million	6. ☐	☐	$100,000-250,000
2. ☐	☐	$5-10 million	7. ☐	☐	$50,000-100,000
3. ☐	☐	$1-5 million	8. ☐	☐	Under 50,000
4. ☐	☐	$500,000-1 million	9. ☐	☐	Don't know
5. ☐	☐	$250,000-500,000			

8 Estimated gross annual revenues for your entire company/institution:
Circle only ONE.
1. Over $1 billion
2. $100 million to $1 billion
3. $5 million to $100 million
4. Under $5 million

9 Estimated number of total employees at this location:
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| 1. Over 5,000 | 3. 500-999 | 5. 100-249 | 7. 20-49 |
| 2. 1,000-4,999 | 4. 250-499 | 6. 50-99 | 8. 1-19 |

3A05-36
NWW1
THANK YOU!

▲
FOLD HERE AND MAIL TODAY

STOP. Did you do the following:

1. Supply old and new address if address has changed
2. Answer all questions
3. Sign and date form

THANK YOU.

Network World

The Weekly for Leading Users of Communications Products & Services

PLEASE TAPE HERE
▲

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"...it's targeted to the people who count —
our customers and prospects."

David Hunter, Director of Communications, Avant-Garde Computing, Inc.

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May 23, 1986

F. Douglas DeCarlo
Publisher
Network World
CW Communications/Inc.
PO Box 9171
Framingham MA 01701-9171

Dear Doug:

A short story I thought you would like to hear:

An advertising rep for one of the more established trade journals
nabbed me at a recent trade show and demanded to know why we had
decided to advertise in Network World.

"It's unproven," he said. "It's redundant," he said. "It's
risky," he said.

"Perhaps," I replied. "But it's also informed. Pithy. Timely.
Attractive. And more importantly, it's targeted to the people who
count -- our customers and prospects. We're going to give it a go."

"See you," he said.

"Yes," I replied. "In Network World."

David Hunter
Director of Communications

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The Weekly for Leading Users of Communications Products & Services

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Opinions

Setting phones free

Rushing through an airport, you stop at a pay phone to make an important call. The person answers, tells you he can't be interrupted and says: "I'll call you right back." As soon as you hang up, the plane begins to board. You dash to the gate and the phone begins to ring.

Anyone who has ever been caught in such a predicament knows that a telephone can either be a window on the world or a choke chain. Developments like the cordless phone, radio pagers and fully portable cellular phones have helped to transform that chain into a flexible tether, but each technology has significant

Cox is division manager of radio and satellite system research at Bell Communications Research, Inc. in Navesink, N.J.

limitations. The telephonic umbilical cord, though less conspicuous and more extended, is still there.

Bell Communications Research, Inc. (Bellcore) is proposing literally cutting that cord. Why not build a universal portable telephone system based upon two-way digital radio technology? It's possible to build a telephone network based on hand-held transmitter/receivers about the size of a cigarette pack. Quality two-way voice and data communications would be available anywhere through a compact, lightweight instrument capable of running for hours without recharging the battery. For the first time, it would be possible to direct a telephone call to a freely mobile human rather than to a fixed telephone handset.

Such a system makes a telephone truly portable; no cord binds the user to a handset. The last 1,000 feet of every connection could be a radio loop, liberating the consumer from his wall jack and saving him the expense of installing one. Mass deployment of transmitter/receivers and the efficient reuse of radio frequencies would let a customer with a portable handset gain access to the telephone network from anywhere.

In a sense, the present-day cordless phone is a rough prototype of such a system. It is light, compact and battery-efficient, because transmission power is low due to the base unit's proximity. Cordless phones can be used anywhere on the telephone network, and when used as an extension phone, they reduce the cost of inside wiring. The catch is that a cordless phone is bound to one base unit. Another shortcoming is cross-talk interference due to a lack of coordinated frequency assignments when several units are within range of one an-

---

The BOCs push into packet-switched networking

Everyone has heard extolled the virtues of packet-switched services operated by local telephone companies. Hourly costs are $1 or less compared with rates of $6 and more typically charged by nationwide packet networks. Most local telephone companies received regulatory blessing when they entered the market.

Having procured and deployed packet-switching equipment, their next step is the lengthy tariff approval process at both the federal and state level.

Unexpected delays in tariffing have resulted in the loss of major customer accounts for at least one Bell operating company: New Jersey Bell. But the tariffing process is nothing compared with the business and technical issues that must be addressed in hookups with interexchange carriers — a sort of equal access for packet switching.

One problem is inter-local access and transport area traffic handoffs between local and long-haul X.25 packet carriers, which are governed by the CCITT X.75 protocol. X.75 does not handle the necessary subaddressing routines for routing calls to specific Latas. X.75 could be implemented differently by each BOC, necessitating BOC-specific tests and interconnections.

It is unclear how the exchange of information between two BOCs will affect billing and network management.

Winther is director of New Communications Services at Link Resources Corp. in New York.

ment when they are connected by a long-distance carrier. These questions must be answered if the BOCs are to offer uniform inter-Lata services via the national carriers at the rates they have been using.

> **❝ Tariff delays resulted in the loss of major customers for at least one BOC. ❞**

The Bell Communications Research, Inc.-sponsored Interconnect Company Forum (ICCF) is trying to solve the difficulties associated with local and long-distance packet hookups.

Committees, formed last year, were originally scheduled to submit reports in the first half of this year, but have not yet reached any conclusions.

Three of the most pressing issues for linking local and long-distance packet networks are network identification, billing and accounting procedures and technical variations. Network identification is handled by the Data Network Identification Code (DNIC), as specified by the Consultative Committee on

International Telephony and Telegraphy.

In the U.S., deciding how to apportion the limited number of DNICs is under the jurisdiction of the Federal Communications Commission. The FCC has assigned four-character DNICs to most major players in the public data network services market to identify their data traffic.

DNICs are assigned for each application, rather than being distributed by company. As a result, some companies have many DNICs, while others have none. Furthermore, only about 50% of the 42 assigned DNICs on the FCC's list are active. Companies like Western Union Corp., ITT Corp., Graphic Scanning Corp. and RCA Global Communications, Inc. all have three or more DNICs. Some ICCF participants argue that, since the number of DNICs is limited, each company should be assigned only one.

The BOCs have yet to be assigned DNICs, but each of the seven regional holding companies will probably be assigned one DNIC number. Bell Atlantic Corp., Southern New England Telephone Co. and BellSouth Corp. already have DNICs.

Since there are 168 Latas and only seven DNIC numbers are expected to be distributed, it is unclear how individual networks will be addressed once traffic arrives at a specific BOC.

The network identification problem grows more acute with the ap-

proximately 50 large private corporate and government networks that typically tie into the public data networks. Westinghouse Electric Corp., for example, operates Wespac, a large private packet network. However, from an addressing point of view, Wespac is a part of Telenet, Inc. Wespac uses both Telenet's DNIC and gateways to public networks. Billing and accounting questions arise over the end-to-end transfer of data traffic between local and interexchange carriers. What accounting statistics can be collected and passed between local exchange carriers and interexchange carriers?

The parties involved in the traffic transfer must decide how the incoming revenue will be divided between the network operators originating the call, the common-carrier transit network operators

> **❝ One problem is traffic hand-offs between local and long-haul X.25 carriers. ❞**

▶ TELETOONS — By Phil Frank

PLUMBIN
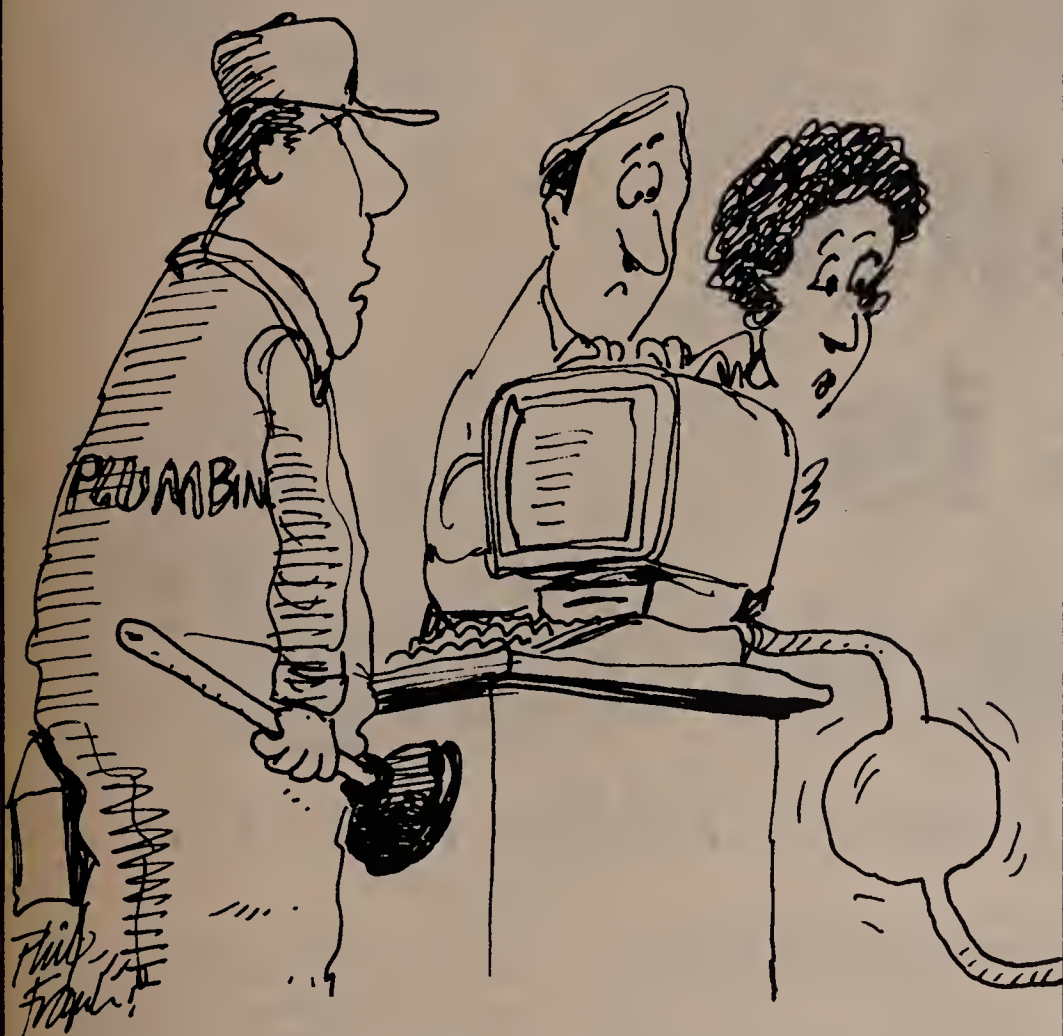
You the folks that called about the slow modem?

Wanted: tariff busters

Life was rather sedate in the communications industry before divestiture. Tariff increases usually came once every several years whether the industry needed them or not, and they usually amounted to 4% or 5%. Whenever someone wanted to add a new service, it was a matter of waiting 28 working days, and the service was installed — timely, reasonably and professionally done.

But wait. It was suggested that AT&T had to divest itself of the Bell operating companies so that competition would govern service and drive down costs. But a funny thing happened on the way to the dance: None of this happened. From October 1983 until November 1984, it was at times impossible to get service installed because of the bickering between the local exchange carriers and AT&T.

And prices. In April 1985, something happened that changed the world of communications forever. The Federal Communica-

Sanger is the lead communications analyst at the Norwest Financial Information Services Group, Des Moines, Iowa.

tions Commission authorized implementation of Tariffs 9, 10 and 11 to replace Tariff 260. This in itself may not appear to be a major cause for alarm since the cost of doing business decreased for some users. However, the long-term effect has been disastrous. For private leased-line users who purchase their end-to-end data service from AT&T and for software planners, it has been a nightmare.

Between April 1985 and April 1986, there were dramatic increases for private-line billing, which were attributed to: the Tariffs 9 through 11 implementation; National Exchange Carriers Association-mandated increases in November 1985; more increases embedded in a tariff change for Serving Wire Center in January 1986; local-exchange carrier and AT&T changes in April 1986; and, finally, independent surcharge changes to become effective in July 1986. For some networks, these adjustments increased costs for service in excess of 60%. Just trying to maintain an updated software package to price these

Scalia knows telecom industry

Judge Antonin Scalia, who will join the U.S. Supreme Court in time for the opening of its next session in October, is the first Supreme Court Justice with an extensive background in the telecommunications and information industries. Scalia, who is currently on the Circuit Court of Appeals for the District of Columbia, is no stranger to policy-makers in Washington, D.C. or to industry leaders.

He first surfaced in the telecommunications industry in 1970, when he was General Counsel in the White House Office of Telecommunications Policy (OTP).

Working closely with Clay T. Whitehead, President Nixon's first director of OTP, Scalia was heavily involved with OTP and with senior Federal Communications Commission staff on the major policy issues of the day — domestic satellites, the FCC's First Computer Inquiry and the specialized common carrier decision, among others. He was an early proponent of introducing competition into what had previously been a monopolistic telecommunications industry.

Pearce is president of Information Age Economics in Washington, D.C. He was formerly chief economist at the FCC.

Scalia taught at the University of Virginia and the University of Chicago law schools and was a scholar-in-residence at the conservative American Enterprise Institute (AEI).

There, he honed his pro-competitive and deregulatory theories, again focusing on the telecommunications and information industries.

The 50-year-old Scalia, married and the father of nine children, performed some consulting work for industry participants during his stint as law professor and scholar. Sidley and Austin, a Chicago law firm that represents AT&T, paid Scalia a $25,800 consulting fee on behalf of AT&T prior to divestiture. In 1980, AT&T paid him a fee of $2,000 for the presentation of a short seminar.

Regulatory and deregulatory questions were of particular interest to Scalia while he was at AEI. He became the editor of *Regulation*, a magazine published by AEI that, under his leadership, advocated extensive deregulation — a position he maintained when he was appointed to the D.C. Circuit Court in 1982.

Since joining that court, Scalia has been involved in many telecommunications policy issues, principally because there is a special relationship between the FCC and the D.C. Circuit Court.

The relationship has its legal origins in the Radio Act of 1927, which preceded the Communications Act of 1934. Section 16 of the Radio Act, which was later incorporated into the Communciations Act, provides that any radio license applicant whose application was refused or revoked by the FCC has the right to appeal the decision to the D.C. Circuit Court.

Today, this special relationship has its legal basis in Section 402 of the Communications Act, which identifies the Circuit Court of Appeals as the court in which appeal may be taken by an applicant for a license or by any other person whose interests are adversely affected by any decision of the FCC.

Consequently, the court has been given broad power to enter a judgment affirming or reversing the policy decisions of the FCC. During the more than 50 years since the passage of the Communications Act, the D.C. Circuit Court has become know as the "expert" court on FCC matters.

Recently, Scalia has been on the bench during major policy-making arguments affecting the future of the telecommunications and information industries. This year, Scalia and the court have scheduled arguments in-
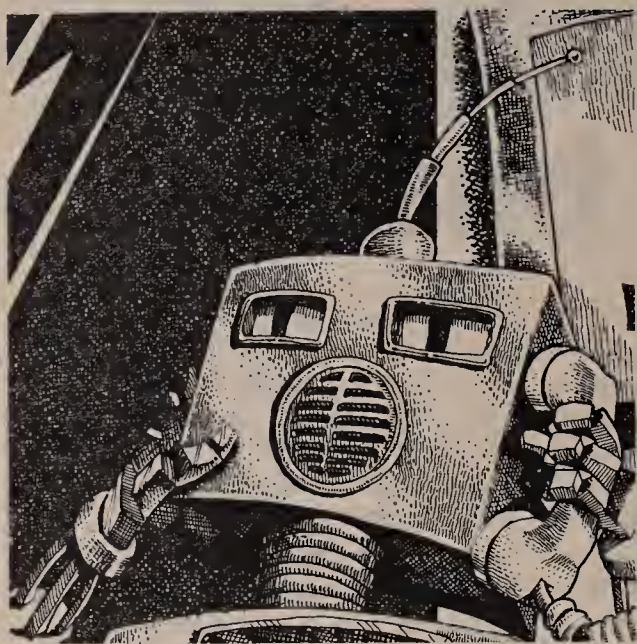
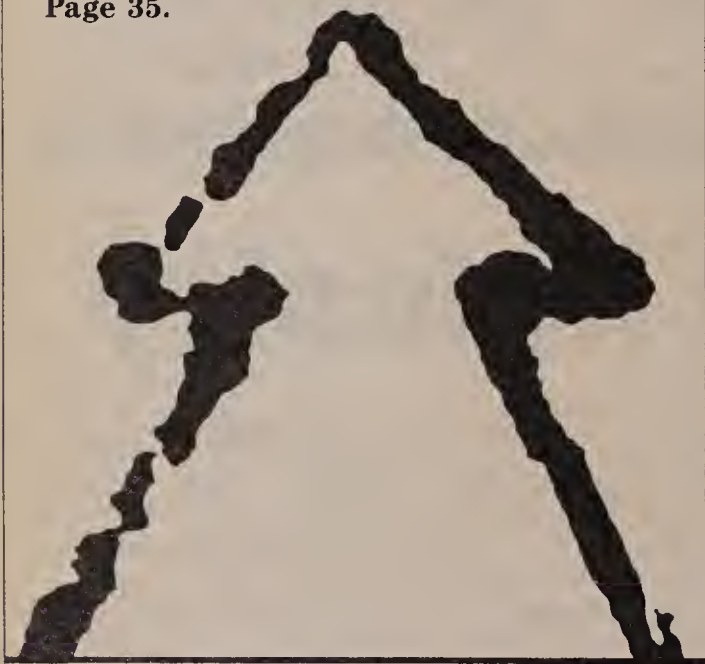**"Hello, this is a recording . . ."**
Voice mailboxes have a long way to go
before they replace receptionists, but
they do offer an alternative to telephone
tag. Vendors in the overcrowded voice
mail market keep adding features to
entice users to make the move from
human to automation.
Page one

Women move up
Since the AT&T divestiture, opportunities
for women have blossomed in the
traditionally male-dominated
communications industry. But women
must still struggle to distinguish between
subtle discriminatory practices and the
everyday dog-eat-dog competition they
encounter in the corporate trenches.
Page 35.

"Hello, this is a recording"

Let your fingers do the talking.

phone answering machine, voice
mail has blossomed into new appli-
cations. Voice mail systems can
now be used to automate the job of
receptionist and to enable callers to
access information by progressing
through a logic tree using their
push-button telephones to respond
to voice prompts. Evaluating every
company and product in this
young, rapidly expanding six-year-
old industry can be a dizzying task.

Comparing systems on an ap-
ples-to-apples basis is difficult be-
cause of the array of features that
are available to users. Systems
range in price from $1,000 to more
than $600,000. Supply today far
outstrips user demand, and ven-
dors are waging marketing wars in
an effort to differentiate them-
selves in the scramble to make a
buck. It's a tough market.

An executive from industry stal-
wart VMX, Inc., one of the three
largest vendors, says his company
is not profitable.

Vendors use the logic tree and
voice prompt concepts in voice re-
sponse systems, although these two
technologies are not considered
true voice mail. Voice response
technology enables callers to use
their telephones as if they were ter-
minals to query a data base and to
elicit voice responses. The remote
host computer acts as if it is talking
to a standard terminal. For exam-
ple, People Express, Inc. airline
uses a voice system from Percep-
tion Technology Corp. in Canton,
Mass., to provide flight information
for callers.

Within the voice mail market,
there are two major vendor fac-
tions: private branch exchange

suppliers, which package voice
mail with their switches, and ven-
dors of PBX add-on equipment.

Although the industry was given
birth and raised by independent
suppliers, Rolm Corp. has leap-
frogged the competition with its
Phonemail product, according to
Dustin Sykes. Sykes is vice-presi-
dent of the Palo Alto, Calif., office
of Vanguard Telecommunications,
Inc., a consulting firm that follows
the voice mail industry. The next
largest companies are VMX and Oc-
tel Communications Corp.

Products from add-on suppliers
run the gamut. Innovative Technol-
ogy, Inc. of Roswell, Ga., for exam-
ple, makes a personal computer op-
tion board that costs slightly more
than $1,000 and serves up to 10 us-
ers. Votan Co. in Fremont, Calif.,
markets an IBM Personal Computer
XT-based system that costs
$10,000 and can serve as many as
200 users. The San Jose, Calif.-
based Centigram Corp. offers a pro-
prietary system based on the IBM
Personal Computer architecture. It
ranges in price from $30,000 to
$80,000 and can support up to
2,000 users. And, at the high end,
Octel sells a system that costs be-
tween $155,000 and $630,000 and
can support up to 7,500 users.

A third voice in the industry, al-
beit fairly faint today, comes from
suppliers of office automation
equipment. Wang Laboratories,
Inc. is the leader in this segment.
Sykes predicts, however, that most
of the future development and
movement in the industry will
come from telecommunications
vendors.

But, office vendors may get into
the business by swallowing up
some small PBX add-on suppliers in
a looming industry shakeout. "I

AJAX CORPORATION. MAY I HELP YOU?

TOM BARRETT
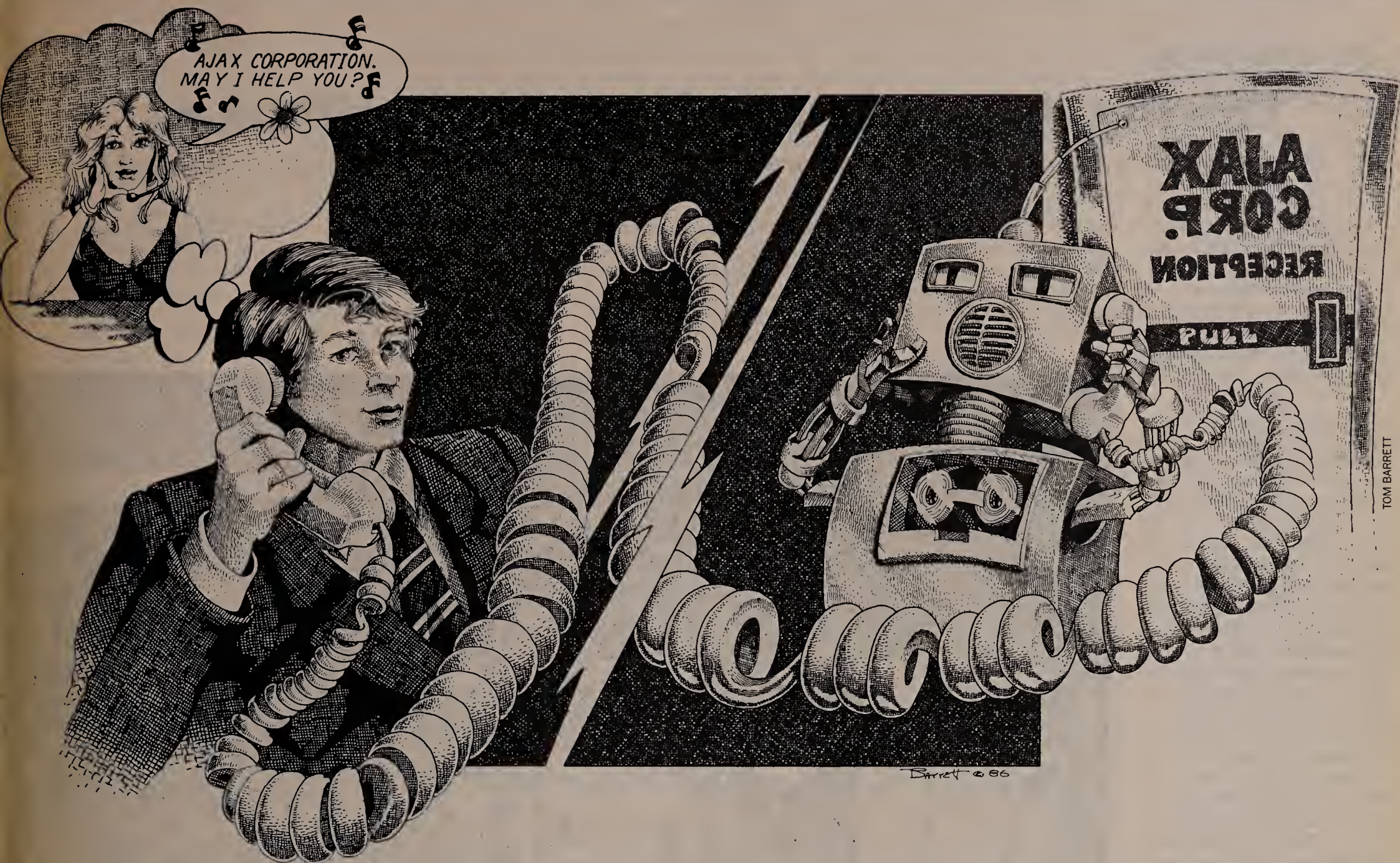
don't think the increasing number of players will survive," says Laura Peck, a senior technology analyst with L.F. Rothschilds, Unterberg, Towbin, an investment banking firm in New York. Peck said many companies did not get enough financing the last time they sought venture capital to sustain themselves.

Oddly enough, the top-flight PBX makers have been unsuccessful in their bid to mimic Rolm's success in voice mail.

"Rolm is doing very well in voice mail. No other PBX vendor is doing anything," according to Ian Angus, president of Angus Telemanagment Group, a consultancy in Toronto.

"If there are 10 Northern Telecom [Inc.] Integrated Voice Mail Systems in all of North America, I'll eat your newspaper," he said. AT&T is still ironing out the wrinkles in its version of voice mail called Audix.

Regardless of the fitful maturation of the industry, some companies are showing signs of success. Voice mail shipments increased 100% from 1984 to 1985, according to William Rich, a telecommunications analyst with Northern Business Research in New York. Rich estimates there are 1,000 to 1,200 systems now installed.

Most of these installations use voice mail like a shared answering machine, as first envisioned when Gordon Mathews of VMX developed the technology back in 1980.

But today, advances in the technology make shopping for even the most rudimentary system a chore. "You can no longer shop for systems by looking for good support," Angus warns. Evaluating voice mail systems takes the same kind of in-depth analysis as any other

communications component.

The basic requirement is the ability to integrate systems to PBXs.

Voice mail integration provides two things: the ability to notify users of mail delivery with a telephone message light or with a broken dial tone and the ability to forward busy or unanswered extensions to a voice mailbox.

Vendors integrate their voice mail systems by tying them into PBXs through an RS-232 port where possible, or by mimicking one of the switch's electronic key sets. Another means of integration is through specially developed line interface cards.

Nonintegrated is less popular

Nonintegrated voice mail systems require more work on the part of the caller and aren't as popular among users as integrated systems. If the called party is unavailable, for example, nonintegrated voice mail systems kick in and ask the caller to enter the person's extension, which the caller may not know. Integrated voice mail automatically switches the caller to the appropriate mailbox.

The ability to bypass voice prompts is an apparently simple feature to look for that pays dividends in end-user satisfaction. Some systems allow users to key in the appropriate tone sequences without having to suffer through each voice prompt.

"You need to think through all of the possibilities," Angus says.

"Does the system, for example, enable you to treat internal and external calls differently? We deal with some organizations where senior management is perfectly willing to have internal calls answered

by machine, but they don't want calls from customers answered that way."

Fielding calls automatically

Fielding customer calls by machine is desirable in some applications. Four-year-old Comverse Technology, Inc. of Woodbury, N.Y., has installed one of its Trilogue voice mail systems at a power company in New York state that is used to answer incoming calls and route them to appropriate extensions.

"Utilities get tens of thousands of calls, and 85% of them want the same thing, to start or cancel service or submit a complaint," says Comverse President Brian Wiltshire. The power company had an average call-waiting period of 10 minutes and says it believes it was losing 40% of its calls.

The Comverse system now answers service calls and routes them to the appropriate extension or voice mailbox by telling the callers their options and by allowing them to punch in the appropriate digits on their push-button phones in response. After holding for a moment, rotary phone users are automatically forwarded to a human operator.

This application combines two features: automated attendant and simple voice mailboxes. The power company could just as easily use the system to give out information instead of taking it in. Users seeking information could route themselves through a simple branching tree option base to the appropriate voice message. Although it goes by different names, this feature is generically called an information mailbox.

Octel combines all of these fea-

tures in what it calls enhanced call processing. According to Octel President Robert Cohn, the company's Aspen system could be used to deliver the following information: "Welcome to the Octel Communications service center. If this is an emergency and you need to talk to someone right away, press 1." This would transfer the call to a live extension.

"If you'd like to know more about our service contracts, press 2." This would transfer the call to a bulletin board with messages about contracts.

"Or, if you'd like to leave an order for parts, press 3." This would route the caller into a voice mailbox.

"Or, if you'd like to talk to someone in sales, press 4." This would route the caller to another menu. "If you'd like to talk to Bob, press 1, or for Nick, press 2."

Companies with multiple locations can create corporatewide voice mail systems by networking their systems.

According to Dal Berry, president and chief executive officer of VMX, Eastman Kodak Co. uses his company's systems in nine locations to network 20,000 users. More than 5,000 messages are carried every day.

Networking enables a user to mail voice messages to many people, regardless of location. A user could, for example, enter a group distribution code and, by punching a single button, send the message to users in San Francisco and New York. VMX's system asks users if the messages should be sent immediately or if they can be deferred. If the message is not urgent, the system will defer the transmission

▶ FORD MOTOR CO.

Driving down costs with voice mailboxes

Automaker says hello to lower phone bills, good-bye to scribbled messages.

DEARBORN, Mich. — Although often criticized as being too costly, voice mail can actually lower phone bills in addition to ending the flood of pink message slips that beseige most office workers.

Ford Motor Co. is one large user that gave its bottom line a boost through installation of a voice mail system.

One year after Ford bought a 64-port, Centrex-based VMX, Inc. system for roughly $500,000, it had already paid for itself, according to Art Fasse, Ford telecommunications operations manager.

The system, which supports 5,000 users, serves two applications: office use at headquarters and field sales support.

Voice mail was first used in field service, supporting district sales offices of the Ford and Lincoln Mercury divisions, as well as Ford parts and services.

The system is used primarily to provide voice mailboxes that collect messages while the salespeople are on the road and to disseminate messages from district sales managers, according to Ford communications analyst Jim Tomanek.

Office applications are standard fare for voice mail systems, which gather unanswered calls and notify users of waiting messages.

Ford is satisfied enough with voice mail to be considering installation of a worldwide voice mail network.

If the network is ever constructed, the company may boost the capacity of its Southeast Michigan facility to support 20,000 users.

With the net in place, Ford could install several systems on the West Coast, one in England to serve Europe and one in Australia to support the South Pacific.

"While we're sleeping, Australia is working, and vice versa," Fasse says. "They could drop messages into a voice mail system and send them all over before they go home."

Ford is exploring the options.

The company is not, however, interested in information voice mailboxes or voice response, which is

the use of telephones as terminals to access data bases.

Fasse says that Ford prefers electronic mail over voice mail for infor-

mation mailboxes and that voice response is an inefficient use of the telephone system.

The only problem the giant automaker had with

the system was an installation delay that was attributed to coordination problems with its local telephone company.

"If you're a Centrex

user," Fasse cautions, "make sure the telephone company is well versed as to what you're planning to do."

— *John Dix*

From **page 31**
until the most economical time of day. Not all of the vendors offer a networking option.

Some suppliers are heralding the messaging capabilities of voice mail over the standard automated attendant and mailbox concept. "With voice messaging, the brunt of your intrabuilding communications is done directly via the voice message system," according to Dave Weinstein, director of product marketing for Centigram Corp. "Instead of looking for you or calling you, I create a voice message and leave it in your mailbox."

Centigram uses single-letter mnemonics to represent system functions, such as "M" to make a message and "P" to play a message. Weinstein argues that users would rather leave voice messages than type out notes via electronic mail.

Experience at some companies shows otherwise. According to Angus from Angus Telemanagement, two firms he has worked with favor their text messaging systems over their previously installed voice mail systems. "For internal use, text messaging wiped voice mail out. People just stopped using it." Users at the high-tech companies, Angus concedes, are probably less afraid of keyboards than customers at other firms.

Voice and text messaging do not have to be mutually exclusive. After it was purchased by IBM, Rolm integrated its Phonemail system with the mainframe maker's Professional Office System (Profs). Customers with Phonemail and Profs can check one source to find if they have mail in either system.

According to Sykes from Vanguard, Northern Telecom is developing something it calls integrated messaging, and AT&T is touting unified messaging. Comverse is trying to hammer out OEM deals with office automation vendors that would enable it to couple Trilogue tightly with processor suppliers' text messaging systems.

Some would argue that tight integration and a list of features as long as one's arm won't do users any good if they can't afford the box. Answering the criticism of cost, Innovative Technology in June released its $2,595 nitaReceptionist, a personal computer board option. This device provides typical automated attendant and voice mail capabilities for up to 10 users. Large systems can be created by cascading devices throughout departments.

Critics say personal computer-based systems do not provide the reliability necessary in a voice mail system. But Sykes and other analysts say they think micro systems may find a home at the departmental level, where managers grapple with problems particular to their areas. Sykes says he does not believe users will create large systems out of micros.

Votan is taking a novel approach. Its personal computer-based voice mail system uses voice recognition to take commands instead of tones from a push-button phone. With this system, callers from rotary phones can create messages by saying "record" and can preview messages by saying "listen." The system is still being beta-tested, according to Bruce Ryon, Votan marketing communications director.

There is a negative side to voice mail. Carelessly implemented systems can offend customers or break down lines of communication. Today, it seems, most callers would rather leave messages with humans instead of recording machines. Being greeted by a recorded message can be disconcerting. Being routed from one canned greeting to another, and then still another, can discourage users altogether.

"Human engineering is critical," Wiltshire of Comverse agrees. "Voice mail can improve a bad situation, but it can degrade service if you replace a human who is helpful." ▪

PAGE 34

Phones from page 28

other. Also, the cordless phone's analog radio signal is vulnerable to eavesdropping.

Portable cellular phones are closer than any other existing technology to a completely mobile communications system. But these phones are designed for the relatively generous size, weight and power capacities of an automobile. The signal strength of cellular transceivers ranges upward to several tens of watts, and reception is handled by large, efficient antennas. To be compatible, cellular units must attain power levels of at least one watt. This requires heavy, bulky battery packs that would provide sufficient power for only 30 minutes between charges.

Also, cellular systems used in cars make no provision for the severe signal attenuation encountered inside large buildings. And cellular signals are frequency-modulated analog waves, which are susceptible to interception.

The trade-off between battery size and power is circumvented by call forwarding, which provides a measure of mobility to the conventional telephone. But it does not eliminate either the telephone cord or the consequent tether effect.

So, what to do? We are in a situation like that of the tourist who is told by the farmer, "Sorry, sonny. You can't get there from here." We must, as the farmer recommends, go somewhere else to start. If consumers want a truly mobile and universal personal communications system, the "somewhere else" might be a telephone system that includes deploying a large number of compact digital transmitter/receivers. These would be located everywhere and would be as ubiquitous as traffic lights, fire hydrants or mailboxes. Eventually they might be regarded as just as necessary an investment.

Such a system would be much

like a vast multiplication of base units for portable phones. Assuming an efficient allocation and reuse of frequencies, this system would let consumers take along a miniaturized telephone handset when leaving home.

Lower power requirements would permit a smaller, lighter and longer operating unit than any likely future generation of cellular phones. Research at Bellcore suggests that attenuation problems inside buildings could be resolved by deploying transceivers on or between floors.

Finally, the use of digital signal modulation would facilitate the encryption of transmissions to ensure privacy. Digital modulation would also provide significant improvements in voice clarity and in the accuracy of data transmissions. Additionally, it would facilitate time-division multiplexing, increasing the network transceivers' capacity just as it increases the ca-

pacity of facilities in conventional wire line applications.

Another benefit would be that the diplexing filter needed for simultaneous two-way communications through an analog cellular phone would be eliminated, reducing its weight by one-fourth.

This system would involve a sizable investment in hardware — thousands of transceivers would be needed for it to work. Cost savings would come through a significant reduction in the plant required for service installations. For the present, Bellcore's goal is to develop working prototypes. The eventual goal is to mount field trials demonstrating, for example, a solution to the airport dilemma described above. At the bottom line, the question is: Would that phone call be important enough to justify investing in a telephone that could be operated while waiting in line to board a flight? Ultimately, the marketplace will provide the answer.∎

Packet switching from page 28

and the receiving network operators. Unanswered questions include which company a customer belongs to, which will do the billing and which is responsible for supporting the end user.

Complicating matters further is the historical difference in the billing practices of the BOCs and value-added network vendors. Value-added net vendors, such as Telenet and Tymnet/McDonnell Douglas Network Systems, Inc., typically bill the party that is called. When remote terminals call a host, such as Dow Jones News Retrieval or

The Source, the host party is billed by the value-added network. Telenet says the host is billed for 96% of its traffic.

Value-added networks see the host as the customer, but the BOCs see the caller or subscriber as the customer. The BOCs are expert at billing the caller, as well as the party called. In voice networking, calls are automatically timed and billed to the caller, and records of the called party are routinely saved. In long-distance billing, the subscriber gets all that information, but local bills are much less detailed. These detailed caller records give

the BOCs a strong marketing advantage in local packet switching.

In August 1985, Bellcore issued a technical advisory titled *Public packet-switched networks, generic requirements.* This document was intended to standardize the features and equipment involved in BOC packet switching. However, there is no conformity among BOC packet-switching services.

There are different access procedures and codes, user interfaces, feature packages and pricing schedules, but there is no central interface certification authority. Any X.25 interface will have to be

individually tested and certified by each BOC offering a packet service.

Case-by-case interconnections and individual solutions to each of these problems are what is most likely to occur. Southern New England Telephone has already developed its own means of interfacing with long-haul carriers Tymnet and ITT. This trend will continue. For end users, the absence of uniform interconnection standards means traffic costs will be driven up. As a result, the 7.5 cent to $1.50 per hour network usage charges envisioned by packet-switching BOCs are not likely to materialize. ∎

Planning from page 29

new structures has become a near impossibility.

Have you looked at a copy of your bill lately? The monthly billing cycle commonly provides large users with between 100 and 300 pages of circuit information. However, lately, it is not unusual to receive boxes of bills totaling around 5,000 pages. And the service detail is so complex that users often throw up their hands in despair and pay the total amount.

If you try to verify the costs, you're in for an extremely difficult task, since AT&T has decided not to indicate the number of miles each local drop uses. Plus, because of the constant changes, there is very little software available that will price your circuitry correctly. AT&T's reply is to clutch a copy of U.S. District Court Judge Harold Greene's divestiture order and the FCC's approval for implementation of Tariffs 9 through 11 and to advise customers that AT&T did not request these changes. That should make the user feel real comfy.

And another thing: Network planning is a real joy in the postdivestiture world. The "what if" questions become complex, and wrong decisions will impact users' bottom lines for years. Should you bridge your circuitry? Should you optimize? What are the cost trade-offs? When problems occur, if your network is bridged, who you gonna

call? Ghostbusters? In terms of bottom-line planning, what will next year bring? Should you anticipate a 5% or 70% tariff increase?

To add insult to injury, it appears that there is a struggle for power between the FCC, Judge Greene and Senator Robert Dole (R-Kan.). Administrators of large networks today need network analysts with strong backgrounds in electrical engineering, network analysis, network design, budgeting — and maybe even political science.

Amid all the politics of the FCC's Computer Inquiry III and the infighting between the FCC's tariff division, Sen. Dole, Judge Greene and the Reagan administration, it is doubtful that the best interests of the public, along with businesses that must operate in this environment, are taken into consideration. Have you ever wondered how long Judge Greene, Sen. Dole and the FCC commissioners would last if they had to administer a network of 4,500 locations in today's postdivestiture environment, using the regulations they have mandated?

The complexity of today's tariff structures and the operational procedures set forth by the exchange carriers and AT&T makes it difficult to maintain a well-oiled communications network. It just goes to show you how much fun the government can have while trying to fix something that doesn't need fixing.∎

Policy from page 29

volving FCC decisions in the following cases.

■ MCI Corp.'s appeal of the FCC's policy to allow AT&T Information Systems to resell AT&T Communications, Inc.'s basic and regulated telecommunications services.
■ The North American Telecommunications Association's appeal of the FCC policy allowing AT&T to abolish its separate subsidiary for customer premises equipment.
■ Telecommunications Research and Action Center's (Trac) suit against the FCC regarding a $100-million rebate ordered to be given to AT&T Communications' long-haul customers. Trac believes that the amount of money rebated should be much greater, whereas AT&T and the Bell operating companies are arguing that the FCC should not have a rebate.
■ Pacific Bell's suit against the FCC regarding tariff shopping. The FCC has made a number of controversial decisions regarding which tariffs prevail — intrastate or interstate — under a variety of conditions. Pacific Bell is arguing that the FCC has gone beyond its tariff-making authority and wants the court to decide who is responsible for what tariffs under a variety of circumstances.
■ The National Association of Regulatory Utility Commissioners wants the court to overturn an FCC policy — the Cox Cable decision —

that preempted state regulation of cable telecommunications services under certain circumstances.
■ Bates Butler vs. the FCC involves a dispute over the FCC's lottery procedures for granting competing cellular radio licenses.
■ The FCC's licensing preference for women is the subject of a controversial appeal. The court had earlier issued an opinion overturning the FCC's preference for women when granting FM radio licenses. The court said there was no rational basis for the preference but later decided to rehear the case.

Some of these cases may be reheard by Judge Scalia when he joins the Supreme Court this fall, following Senate confirmation. He may, of course, excuse himself from certain cases because of his previous involvement. This is by no means either certain or necessary, since it involves the judicial canon of ethics and an appropriate legal interpretation of them.

Judge Scalia is a man of integrity — a mixture of pragmatic politician, ideological conservative and legal scholar. His predisposition is to relax the rules of the telecommunications and information industries, although he will be constrained by whatever interpretation he and the Supreme Court place on the Communications Act of 1934. On the whole, Scalia's appointment to the Supreme Court is good for the industry.∎

Women move up

In most communications industry hiring decisions today, know-how is a bigger factor than gender.

BY LOIS SLAVIN
Special to Network World

From its beginnings and until the AT&T divestiture, the communications industry was entrenched in a male-dominated, monopolistic bureaucracy, isolated from evolving attitudes toward women in the business world. For many women, divestiture and deregulation in the communications industry have meant divestiture of traditional constraints and mores that have held them back.

"[Women's] salaries are getting higher, even at the lower levels," says Pamela Westcott, chief of telecommunications for the International Monetary Fund. "There's no way without [U.S. District Court] Judge Greene and his [divestiture] decision that I'd be making the kind of money that I am today. No one believed [telecommunications management] was worth anything before."

Jack Sayers, associate director of Source EDP Personnel Services, Inc. in Boston, a firm that specializes in placing high-tech professionals, agrees. "Communications is just starting to become an industry that's in demand," he says. "There's a real need for qualified, educated people. I've seen little, if any, discrimination in hiring. And there appears to be a fairly high percentage of women in the communications work force — I would say that 35% to 50% of positions might be held by women.

"As with most industries," he continues, "men hold most of the senior positions at this point. But I see as clear a path to the top in telecommunications for women as there is anyplace. Telecommunications is a technical discipline, and

Slavin is a free-lance writer based in Cambridge, Mass.

the people who have the best technical skills advance the furthest."

Nevertheless, many groups that support women in communications professions have been formed. The International Organization of Women in Telecommunications (IOWIT) was founded in Los Angeles in 1979 to address industry-specific women's issues. Although IOWIT is no longer actively involved with regional organizations and acts primarily as a networking referral service, it has spawned many local organizations that are now independent.

Dee Dolan, executive director of The National Alliance for Women in Communications Industries (The Alliance), says, "It was difficult for national organizations to keep their fingers in all the organizational pies. It became more productive for local organizations to incorporate independently and then make the national organization an informal, rather than a formal, entity."

The Alliance, based in Washington, D.C., was once an IOWIT chapter, but was reincorporated as an independent organization that deals with national, broadly based issues. A second organization that started out nationally, but now has only informal ties with its independent affiliates, is Washington, D.C.-based Women in Information Processing.

Regional organizations include New York's Empire Wo/Men in Telecommunications, Boston Women in Telecommunications, IOWIT/Indianapolis, Los Angeles WIT, IOWIT Michigan (Detroit) and Capital Wo/Men in Telecommunications in Washington, D.C.

As all this organizational activity indicates, there is indeed a sizable number of women in communications. More than 53% of all communications industry positions are filled by women, according to

Women in Information Processing. But at what rung on the corporate ladder are most of these women to be found? This is difficult to answer, says Dolan, because no formal research has been completed.

Dolan says the Bureau of Labor is still compiling statistics on the industrial economy, even though the world has moved on to an information economy. "[The Bureau of Labor] only measures whole industries, such as banking, so the figures don't give us a way to delineate and track information on technically intensive positions within the various sectors," she observes. The Alliance claims it is now in the process of putting together statistics and demographics that will do just that.

In the meantime, informal studies by a number of professional organizations, such as Women in Information Processing, indicate that the majority of women in communications professions are in entry-level positions.

"This can be good and bad," says Janice Miller, director of Women in Information Processing. "On one hand, more women have the opportunity to climb the corporate ladder. But on the other, they have to be careful to demand and get equal pay. Otherwise, an entry-level job can be a dead-end position."

Dolan says there are precedents for such occurrences. "Whenever there is a great influx of women into a particular sector, salary levels automatically fall because the work becomes devalued. This has happened in many industries. Within communications, it's most notable in data processing. DP used to be a good entry point for women who aspired to senior management positions. Now, it's a computer ghetto."

Dolan cautions women to be aware when entering the communi-

cations field. "Although opportunities may appear real," Dolan says, "they're often a disguise for another dead-end job. Women need to know this because it's happened consistently elsewhere. And they need to ask if what is happening in the communications industry will differ from national and historical trends. I've already heard about a manager in one company who said that most of his communications people are female because they don't pay enough to hire males."

Although the majority of women are in lower level jobs, there are those whose career paths have taken them to higher points on the corporate ladder. Only 15% to 20% of them are in mid-level management, and just 5% are in upper management, according to Women in Information Processing. Despite these figures, Miller says, "Telecommunications is such a booming career area, it's a good industry for women to be in."

As Rita A. O'Brien, Rhode Island vice-president for New England Telephone & Telegraph Co., recently told attendees of The Alliance's Leadership '86 conference in Washington, D.C., "It's true that I am the only woman at the present time responsible for the total operations of a telephone company. But that is one more than it was five years ago and fewer than it will be in the near future."

According to Miller, "Women in Information Processing does an annual survey of the whole telecommunications industry, and we find that salaries are generally a bit lower for women [than for men]. Also, if you're working for [Communications Satellite Corp.] let's say, and you're managing an R & D department, you'll probably be getting quite a bit more money than working for [a nontelecommunica-

Calendar

July 14-15, Cambridge, Mass. — Negotiating the Best Deals on Telecommunications Products. Also, July 17-18, New York. Contact: Boston University Seminar Coordination Office, Suite 415, 850 Boylston St., Chestnut Hill, Mass. 02167.

July 14-15, Orlando, Fla. — Networking the IBM PC or Compatibles. Also, July 24-25, Morristown, N.J.; July 28-29, Boston. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 14-16, Washington, D.C. — Deregulatory Readiness of the Telecommunications Industry. Contact: Telestrategies, 1355 Beverly Rd., McLean, Va. 22101.

July 14-16, Chicago — Fiber-Optic Communications. Also, Aug. 6-8, New York; Sept. 15-17, San Francisco; Oct. 20-22, Boston; Nov. 3-5, Chicago. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521-2939.

July 14-16, Arlington, Va. — Network and Communications Security Workshops. Contact: Computer Security Institute, 360 Church St., Northborough, Mass. 01532.

July 14-16, Las Vegas — Hands-On Data Communications: An Advanced Approach. Also, July 21-23, Sacramento, Calif., and Chicago. Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 14-17, Boston — The Software Trends for Executive Planning and Strategy Conference. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 15, Dover, Del. — Achieving Excellence: How to Implement the New "Excellence-Oriented" Management Style in Your Department or Company. Also, July 16, Wilmington, Del. Contact: CareerTrack Seminars, 1800 38th St., Boulder, Colo. 80301.

July 15-16, New York — Intercompany Networks: EDI and Beyond. Contact: The Yankee Group, Seminar Division, 89 Broad St., 14th Floor, Boston, Mass. 02110.

July 16-17, Los Angeles — Fiber Optics in Plain English. Also, August 6-7, Chicago. Contact: Clifford, Inc., 83 Main St., Bethel, Vt. 05032.

July 16-17, San Francisco — PC Communications. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

July 16-17, Washington, D.C. — Educational Seminar on T-1 Facilities and Networking. Contact: Timeplex, Inc., 400 Chestnut Ridge Rd., Woodcliff Lake, N.J. 07675.

July 16-18, San Francisco — Telecommunications Management. Contact: Business Communications Review, 950 York Rd., Hinsdale, Ill. 60521.

July 16-18, Washington, D.C. — SNA Architecture and Implementation Seminar. Also, August 13-15, Boston. Contact: Communications Solutions, Inc., 992 S. Saratoga-Sunnyvale Rd., San Jose, Calif. 95129.

July 17-18, San Francisco — Telecommunications II: Integrated Voice/Data and Digital PBX. Also, Aug. 4-5, Washington, D.C. Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08705.

July 17-19, Washington, D.C. — Use of Microcomputers in Telecommunications. Contact: United States Telecommunications Training Institute, Suite 400, 1255 23rd St. N.W., Washington, D.C. 20037.

July 20-23, Toronto — Directions at Toronto: Strategies for Information Management. Contact: Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211.

July 21-22, Boston — T-1 Networking and Bypass. Contact: Business Communications Review, 950 York Rd., Hinsdale, Ill. 60521.

July 21-22, San Diego — The IBM Personal Computer XT/AT: Maximizing Its Potential. Also, July 23-24, Denver; July 31-Aug. 1, Washington, D.C.; Aug. 25-26, Boston. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

July 21-22, New York — Communications I: Technology Overview. Contact: Datapro Research Corporation, 1805 Underwood Blvd., Delran, N.J. 08075.

July 21-23, Washington, D.C. — Hands-On Troubleshooting. Contact: The American Institute, Inc., Carnegie Building, 55 Main St., Madison, N.J. 07940.

July 21-August 1, Washington, D.C. — Uses of Microcomputers in Telecommmunications. Contact: United States Telecommunications Training Institute, Suite 400, 1255 23rd St., N.W., Washington, D.C. 20037.

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P.O. Box 9171
Framingham, MA 01701-9171
(617) 879-0700

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* Nov. 17 - Communications Processors
* Dec. 15 - Communications Software

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* Aug. 4 - ISDN
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tions company like] Pepsico, Inc. This is a relatively new industry, like the computer industry, and if and if you're willing to work hard and learn, the possibilities are unlimited."

The primary questions for many women include how to advance, enhance and refine their own careers; how to compete effectively with other women in the workplace; and how to balance their personal and professional lives.

According to Vicki Brown, a $175,000-a-year senior vice-president of sales and marketing at Timeplex, Inc., it's important that women who want to get ahead work for managers who are open and supportive.

"I've always worked for managers who could handle someone who wants to take on more responsibility, people with whom I could freely discuss my ideas," Brown says. "And I've always placed myself in an environment that provides challenge and opportunity."

Lack of support from superiors, subordinates or peers is another situation male and female managers alike face daily. Yet Usha Viswanathan, human factors specialist at Burroughs Corp., says she believes that all too often, women take this too personally. "Women tend to seek more support from their subordinates. They think it validates them as a manager," she explains.

Another issue of concern to many women at mid-managerial levels is the opposition they say they find from other women within their organizations. "Women seem surprised when other women become competitors, yet it happens with men all of the time," one female senior product manager says.

Says Viswanathan, "Female managers often make the mistake of favoring male subordinates over females. Women should not be ashamed of competing with other women or men, but should be direct and honest with subordinates and seek out the opinions of subordinates to find out what their goals are. That's where the solution lies, not in playing more political games."

As women progress to more demanding positions in telecommunications, they must face the problem of balancing personal and professional responsibilities.

The International Monetary Fund's Westcott began her career 20 years ago as a long-distance operator with GTE Corp., where she made $50 per week. She then worked as a branch manager for ITT Corp.'s Terryphone (an industrial intercom paging system) division, as a project manager at Rolm Corp. and as a manager of telecommunications at a small consulting firm. Today she is also the president of the Rolm users group.

At one point in her career, Westcott says she realized that to advance, she would have to take a job requiring extensive travel. After discussing this with her family and getting their support, she accepted a position with ITT as a regional trainer. For almost a year she was on the road five days a week.

Westcott says this was a challenge for her husband, who also works full-time, and for her children. Roles and responsibilities shifted as everyone had to assume household duties. But it eventually paid off for Westcott. As chief of telecommunications, she now makes about $80,000 a year.

Other women have different ways of juggling professional and personal responsibilities. Some opt for long separations from their husbands while they pursue their respective careers.

One woman, a department chief in development analysis at AT&T, lived apart from her husband for more than half of their eight-year marriage while both pursued their careers.

Why did she do it? "I never expected to have an easy life, because I want to have everything, including a career and a family," she explains. Does she feel she actually does have it all? "Yes, I do have it all, but sometimes I wonder whether it's all worthwhile, and if I'm trying to shorten my life. But I feel like I can't stop." Other female managers echo her sentiments, and although they say they don't want to stop, they would at least like to slow down.

As the corporate workplace gradually becomes more tolerant of homogeneous roles for women and men, women are seizing the opportunity to move up. Comments Westcott, "Telecommunications management is opening up new avenues for women, because it was always considered a clerical thing to do. There's a whole influx of women who held clerical positions, and because they were the only ones who knew what was going on, their services are far more valuable to people now. Women who have been in the industry for years have become legitimized."

"As president of the Rolm users group, I have a huge number of women who were receptionists or office functionaries who suddenly have managerial positions. Maybe they're real low-level, and they're probably not well-paid yet, but I think that their time will come," Westcott concludes.

The Alliance's Dolan sums it all up like this: "We're no longer dealing with man power in the literal sense as with the old industrial industries. We are dealing with skills that are not gender-specific. If you can get the job done, you can usually get the opportunity to do it. The holdover of the male hierarchy is still there, but that system is not cast in concrete."

However, she cautions, "If women are not proactive while these industries are growing, they once more are going to be in a reactive position, looking over their shoulders saying, 'What happened to us? We don't have the jobs, we're not in the boardrooms.' Women should get with it and make contributions now while the industry is growing." ⚡

► NET OPTIONS

Datos tool offers data over voice

BY MARY PETROSKY
West Coast Correspondent

VAN NUYS, Calif. — A new low-cost data communications system that combines data switching with data-over-voice technology has been developed by Datos Corp. in conjunction with Compania Telefonica de Espana of Madrid, Spain. One early user has found the system to be an economical alternative to standard local networks but has faulted the product's messaging software.

The system supports circuit-switched data at speeds up to 384K bit/sec half-duplex or 192K bit/sec full-duplex over existing telephone-type twisted-pair wire. The average price per connection ranges from $400 to $600, including installation, according to David Hemmings, Datos' president and chief executive officer.

The Datos system uses desktop units to squeeze a data frequency onto existing telephone lines without disturbing the voice frequencies. A complementary filter installed in a telephone wiring closet is used to separate the two signals.

The data circuit is then attached to the Datos switching unit in the wiring closet. According to Jim Westbrook, vice-president of engineering for Datos, the company's data-over-voice technology can support data rates 20 times faster than other data-over-voice products.

Switching units are nonblocking for up to 512 ports, although configurations of up to 20,000 ports can be achieved by linking switches. Each switch is connected to an IBM Personal Computer XT or AT that handles net management functions. When users attempt to establish a connection to another device, a controller card within the switch routes the request to the micro, which determines if the appropriate ports and lines are available.

Hemmings said that by year end, the company intends to support a version of Novell, Inc.'s Netware on the personal computer attached to its switch. This would enable the micro to act as a multiuser file server for switch users.

The Datos network's data rate, its use of existing telephone wiring and low cost made it attractive to the California Institute of Technology in Pasadena, Calif., according to Dave Chan, a computer analyst. The Institute has acted as a beta site for the system for six months. The Datos system is used to connect personal computers, minicomputers and other devices used by the Institute's biology department, which is housed in five buildings.

Although the Institute has an Ethernet backbone network running throughout the campus, adding Ethernet ports would have cost $1,000 per device, Chan said. "A lot of networks provide remote servers. We don't need to do that. We have several minicomputers we want to use as host systems."

Chan looked at data switches next, but said their maximum throughput, which ranged from 9.6K bit/sec to 19.2K bit/sec, was too slow.

One problem Chan has encountered is with the network's messaging software. If a personal computer has been turned off, messages cannot be delivered and are subsequently lost.

"As a product, it's incomplete, but it could become a good, functional network," Chan said. ⚡

► JAPAN

Space venture launched

BY TAKEHISA KONDOH
CW Communications International News Service
Asian bureau

TOKYO — Nippon Telegraph and Telephone Corp. (NTT) and eight other giant Japanese companies last week said they will join forces in October to establish a research firm for space communications. Some $62.5 million will be funneled into the new venture in the next 10 years to develop advanced equipment for satellite and mobile communications technologies.

Tentatively named the Space Communications Development Co. (SCDC), the group includes representatives from Kokusai Denshin Denwa Co., Japan Broadcasting Corp., Toyota Motor Corp., Tokyo Electric Power Co., Toshiba Corp., Mitsubishi Electric Corp., Hitachi, Ltd. and Fujitsu Ltd.

About 70% of the initial capitalization of $3.1 million will reportedly be financed by the Japanese government's Basic Technology Research Promotion Center.

SCDC will focus its research and development efforts on devices such as large-diameter antennas, power amplifiers and 22 GHz to 27 GHz transmitters and receivers.

The move underscores Japan's growing interest in the space communications business. The government recently approved satellite launchings by two private firms, Space Communications Corp. (SCC) and Japan Communications Satellite Co. (JCSAT).

SCC and JCSAT have plans to launch their communications satellites in early 1988. The expected entry of Satellite Japan Co. emphasizes the emergence of Japanese communications from regulated monopoly to competitive business. ⚡

▶ PRODUCT REVIEW

Choosing the smart man's LAN

Gandalf and Racal-Milgo lay data over voice lines to create a low-cost LAN.

BY JOHN J. HUNTER
Special to Network World

Within the last year, a breed of product that lets voice and data simultaneously share the in-house wiring system now employed for telephone lines has entered the marketplace. These products, referred to as data-over-voice networking systems, have been dubbed "the poor man's local-area network."

Actually, calling them the "smart man's local-area network" would be more appropriate. With these products, users can employ existing wiring as opposed to buying and installing coaxial or fiber-optic cable or some other type of wiring. Also, the new hardware associated with local-area networks, such as terminals and servers, is not needed.

Local-area networks do provide high bandwidths — anywhere from 1M bit/sec to more than 10M bit/sec — and are well suited for installations with a large number of users. But small- to medium-sized companies may never need this capacity, and they certainly don't want to bear the expense of a local net. In addition, there is some question as to how well local nets handle voice.

Typical data-over-voice systems employ a scheme that separates data input from data termination equipment (DTE) and from voice conversations, but lets both types of input share the same two-wire telephone lines to carry information to the terminating locations. From there, a similar device separates the voice and data channels, sending the former to the private branch exchange and the latter to central data equipment.

Two products that perform voice-over-data services are the Gandalf Data, Inc. Line Miser DOV 640 and the new Racal-Milgo, Inc. Localink. Both furnish essentially the same services, but as the chart at right shows, the Gandalf unit has a leg up in overall capability. In addition, Gandalf offers a voice-and-data switching system called Dovtrex that works with the Line Miser to provide a fairly sophisticated data switching facility.

Both units have one RS-232-C interface to attach the DTE equipment and an RJ11 jack for the telephone. Only analog telephones can be used with Localink, while the Line Miser works with both analog and digital phones, provided the voice conversation is within the voice bandwidth and the telephone is not using unique signaling.

Both products use 20-, 22-, 24- or 26 gauge unloaded two-wire telephone lines to carry voice and data

John Hunter is president of TMS Corp. in Devon, Pa.

simultaneously. Data is added to the line above the voice band. Racal-Milgo accomplishes this by employing frequency shift keying (FSK) to convert the digital inputs to analog signals. Gandalf, on the other hand, employs time compression multiplexing (TCM).

The FSK technique works fairly well with low data speeds, but as the speed of the digital signal increases, time allocated to shift frequencies is reduced and both the production and detection of changes is more difficult. For that reason, FSK is limited to lower data speeds.

TCM allows the Line Miser to transmit synchronous data at 64K bit/sec, while the Racal-Milgo unit's FSK technology is pushing its limit to achieve 19.2K bit/sec.

The theory behind TCM is fairly simple. Users wishing to communicate with each other in full-duplex mode must receive at the same rate as they transmit. In digital mode, concurrent transmission and reception on the same wire pair is impossible unless some means is provided to separate the two data flows.

Essentially, TCM does this by allocating alternate time slots for data transmission and reception. Transmission is at a much higher data rate than the nominal rate of the connection. This quick alternate switching between sender and receiver, called ping-ponging, allows for full-duplex operation over two-wire circuits instead of four-wire circuits.

Both the Gandalf and Racal-Milgo units are intended for point-to-point applications over local connections. The distance between the sender and the end point depends on the gauge of the wire carrying the information and the transmission speed. The smaller the wire and the higher the data rate, the shorter the distance will be.

For example, Gandalf literature shows that a 24 gauge wire carrying data at 9.6K bit/sec has an operating range of 18,000 feet. When the data rate increases to 19.2K bit/sec, the range drops to 12,000 feet. The latter are vendor-supplied numbers, which look a bit conservative. Racal-Milgo states a maximum range of five miles for its product, operating at 14.4K bit/sec.

As shown in the chart, the Gandalf unit offers a number of features unavailable on Localink. With a top synchronous speed of 64K bit/sec, the Line Miser can transfer files more quickly and it can handle applications such as graphics more efficiently.

Racal-Milgo claims to have developed a 19.2K bit/sec capability to be introduced soon. That speed, however, only matches the asynchronous capability of the Line Miser and is less than one-third of

what the Gandalf unit can do with synchronous data.

Employing TCM allows the Line Miser not only to handle higher data rates easily, but permits it to pass control signals in each direction. It also lets the vendor build in remote digital loop-back tests. I know of no FSK-based systems that can do either. Should Integrated Services Digital Networks adopt TCM as their standard, the Line Miser will be in a good position to interface with them.

Configuratively speaking

Both the Line Miser and the Localink units are available in stand-alone and rack-mount configurations. Both the Localink stand-alone unit and rack-mount, or central-site card, interface with only one DTE and one telephone. When used with the Racal-Milgo Type 7 Card Cage, it can accommodate up to 16 cards.

The Line Miser's stand-alone unit also handles one DTE device

Vendor/Product		
Gandalf Data, Inc. DOV 640	Racal-Milgo, Inc. Localink	
64K	14.4K	Synchronous data speeds (bit/sec)
19.2K	14.4K	Asynchronous data speeds (bit/sec)
3	5	Operating range (miles)
✓		Loop-back testing
TCM	FSK	Modulation scheme
✓		Control signals passed

FSK = frequency shift keying
TCM = time-compression multiplexing

SOURCE: TMS CORP., DEVON, PA.

and one telephone. The rack-mount version, however, accommodates eight devices per card, and up to 120 such terminations can be configured into a single rack. The stand-alone Localink unit is priced at $350; the rack-mount version is $318. The Line Miser is priced at $275 for the stand-alone version and $200 for the rack-mount version.

For users requiring more sophisticated switching facilities, Gandalf offers the Dovtrex voice/data switching system.

This unit employs the Line Miser at the DTE end, and Dovtrex handles the chore of routing voice to the PBX or Centrex unit and data to the computer system. Centrex consists of a two-shelf cabinet that handles up to 120 DTEs or tele-

phone units per shelf. Up to seven shelves can be linked together to form a system node, and up to 32 nodes supporting 23,500 devices can be networked.

Dovtrex provides some sophisticated switching facilities for a non-PBX system. For example, if a requested port is busy, the system will queue the requestor and service him either on a first-come, first-served or priority basis. The system provides several levels of priority, and the operator can initiate a forced disconnect to service a high-priority request. Not many data or digital PBXs on the market can match those features.

The unit provides security by passwords and group restrictions. The system administrator can specify up to 64 groups and up to 1,024 passwords. Users can also be restricted as to the types of operations they can perform. For communications outside the local network, Gandalf provides access to X.25 networks, all digital transmission services and IBM environments. Even a bridge to Ethernet can be arranged. A typical Dovtrex system costs about $600 per channel, which is less than most digital PBXs and local-area networks.

Systems such as the Gandalf and Racal-Milgo units are good alternatives to local-area nets. However, local net vendors might argue otherwise. But what advantage does a local-area network have over a switched-based system employing products such as the Line Miser and the Localink?
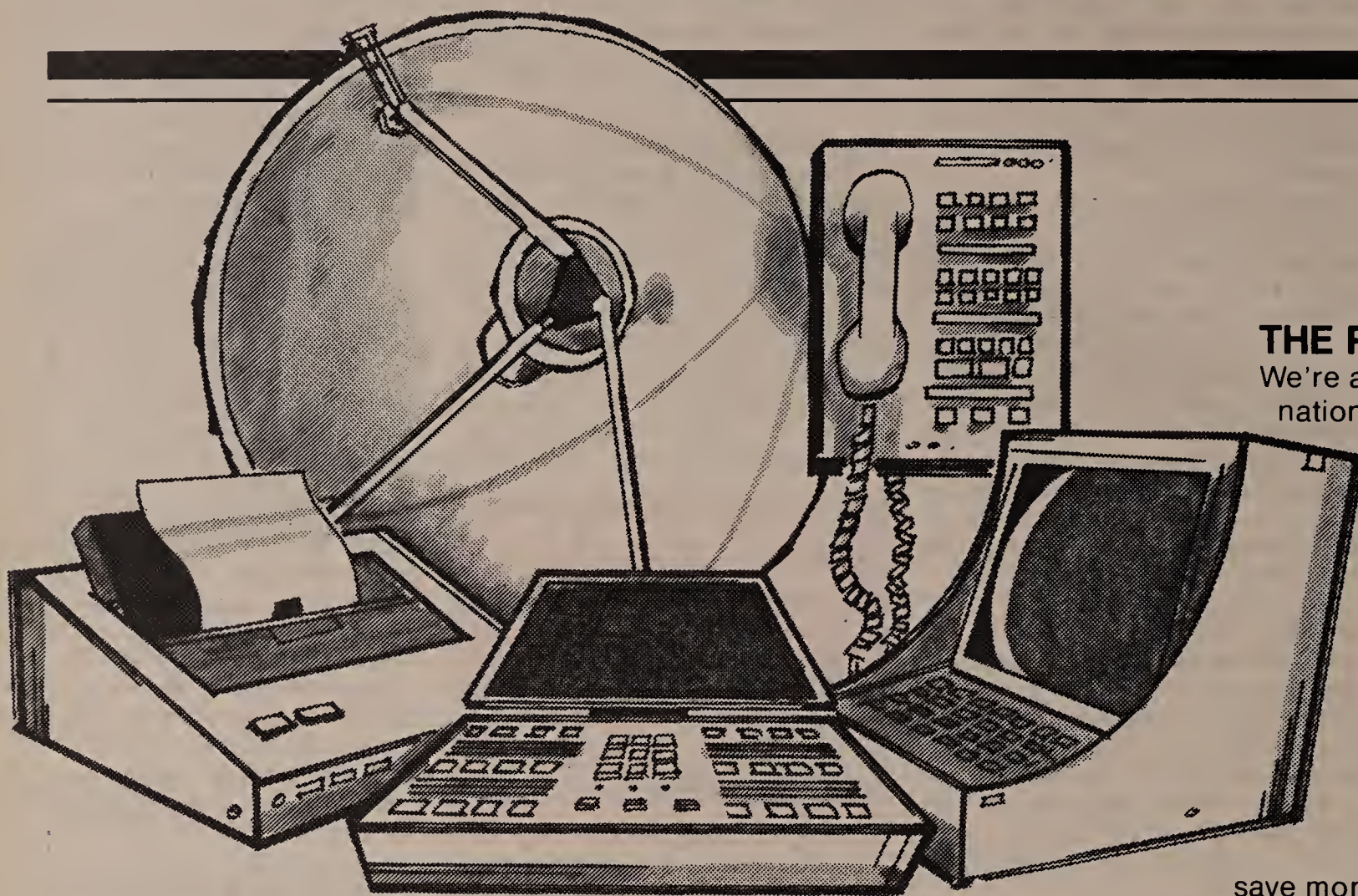
The local-area network substitutes a single cable for many cables, but the telephone wires you'll be using are already in place and are paid for. Another advantage might be that the local net permits many users to share the same cable. That's true, but you pay for this convenience with sophisticated hardware and software to avoid calamities such as message collisions and lost tokens.

Another argument is that a local-area network eliminates the expense of buying a central switch to control the routing of messages around the network. Furthermore, eliminating that device removes the possibility that its failure will bring down the entire network.

Finally, some say that local-area networks provide a usable bandwidth in the megabit range, permitting such bandwidth hogs as teleconferencing, computer-aided design and manufacturing and high-speed graphics to run simultaneously with file transfers and normal data traffic. While that's true, how many organizations really need that capability? Also, few local nets do a good job with voice, and few offer the levels of security available with a system such as Dovtrex.▫